



80" FUSION X3D



SPECIFICATIONS:

Wingspan: 80"

Wing Area: 1375 sq. in.

Length: 77.75"

Approx. Weight: 11.5 lbs.

**Engine: 1.60-2.10 two-strk, 1.40-2.10
four-strk**

OHIO MODEL PLANES

199 Stratford Lane

Xenia, Ohio 45385

(937) 372-0603

www.ohiomodelplanes.com

email: sales@ohiomodelplanes.com

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Version 3.0, Jan 2007

Thank you for purchasing the 80" Fusion X3D Profile aircraft. The newest addition to the Fusion lineup of high performance aircraft from OMP brings giant scale to the Fusion performance. Being 80" the Fusion is IMAA legal to fly at all giant scale events. The OMP Fusion X3D delivers all the high energy precision and 3D its little brother is known for and comes complete with an airfoiled stab and elevator for even more precision and control. The Fusion will perform any IMAC, Pattern, or 3D sequence with ease and give you a whole new radio control experience. The Fusion X3D offers the best of both worlds to the sport flyer at every level. You can learn precision and 3D aerobatics at a fraction of the cost of a giant scale aircraft. Our Fusion X3D offers the perfect blend of aerodynamic design parameters which allow you to perform anything you can imagine: F3A pattern, IMAC sequences, elevators, positive and inverted harriers, waterfalls, knife edge spins, positive and inverted flat spins, and of course rock solid hovers and torque rolls. The Fusion X3D enjoys extensive laser cutting and CNC cut foam cores. This means that only a few sticks need to be hand cut by the builder. Almost all angle cuts have been laser cut for accuracy and quick building speed. OMP kits are like no other we strive to make your building experience enjoyable and easy.

A QUICK WORD ABOUT SAFETY AND RADIO CONTROL FLYING MODELS

With radio control aircraft, like any hobby or sport, there are certain risks. The operator of these models are responsible for these risks. If misused or abused, you may cause serious bodily injury and/or damage to property. With this in mind, you will want to be certain that you build your model carefully and correctly. If you are not an experienced flier, have your work checked and ask for help in learning to fly safely. This model aircraft is not a toy and must be operated and flown in a safe manner at all times. Always perform a pre-flight check of the model including all control surfaces, proper function of the radio gear, structure, radio range, and any other area relating to the safe operation of this aircraft.

Models are not insurable but operators are. You can obtain coverage through membership in the Academy of Model Aeronautics (AMA). For an AMA information package call 1-800-435-9262, ext. 292 or visit the AMA website at "www.modelaircraft.org".

OHIO MODEL PLANES GUARANTEE AND CUSTOMER SERVICE

Ohio Model Planes guarantees this kit to be free from defects in both material and workmanship for 30 days from the date of purchase. This does not cover any parts damaged by use, misuse or modification. In no case shall OMP's liability exceed the original cost of this kit. Because OMP has no control over the final assembly or equipment/components used in the final assembly, no liability shall be assumed for any damage resulting from the use of the this model by the user. By the act of using the final assembled model, the user accepts all resulting liability. If you should find any missing or damaged parts, or have any questions about this product, please contact us at sales@ohiomodelplanes.com or call OMP at (937) 372-0603.

ENGINES, PROPELLERS AND MUFFLERS

The recommended engine range for the 80" Fusion is a 1.60 to 2.10 two-stroke engine or a 1.40 to 2.20 four-stroke engine. There are a tremendous variety of engines available and each type has its own advantages and disadvantages. The 2-stroke engines are lighter and more powerful for their weight while the 4-stroke engines are somewhat heavier but are quieter and usually have better torque transition. Additionally, the 4-strokers can turn a larger diameter prop that can deliver more airflow over the control surfaces. The choice is purely pilot preference. Selecting the proper size of propeller for your particular engine is a very important part of the whole set up. The 80" Fusion, as all 3d profiles, was designed to use low pitch props. What you need is airflow and vertical performance, not straight-line speed. We recommend using the lowest pitch, highest diameter propeller you can find for your particular engine. The use of high pitch props can cause air "cavitation" around the prop blades during hovering or slow vertical maneuvers. Air cavitation may sound neat but it's not what you want because the prop is no longer biting into "clean air" and you may lose altitude very quickly; so be wise when selecting your prop. Also, please be aware that the power available in today's engines, while tremendously advantageous for 3d flying, can quickly lead to over speeding the plane. Manage your throttle wisely to prevent over speeding and stressing the airframe.

Note: This manual covers both the kit and ARF versions of the 80" Fusion X3D. As with all kits, it's a good idea to read all the instructions and study the plans before you begin construction. Make sure you have a flat and sturdy workbench and follow all safety advice for the tools and adhesives you plan to use. If you have purchased the ARF please skip down to the "Final Assembly Section".

Fusion X3D Material List: (balsa except where noted)

<u>Sheets and Sticks</u>	<u>Quant</u>	<u>Laser Part Sheet Pack</u>	<u>Quant</u>
1/16 x 1/4 x 36	4	3/32 x 4 x 42	4
1/16 x 3/8 x 36	4	1/8 x 4 x 36	1
1/16 x 4 x 42	21	1/4 x 4 x 36	2
1/16 x 1 x 40	6	1/8 x 3 x 36	2
1/16 x 1 x 30	4	3/8 x 3 x 18	1
1/16 x 4 x 36	4		
1/8 x 1/4 x 40	8	<u>Small Parts</u>	
1/8 x 1/2 x 36	1	CD Manual	1
1/4 sq. x 18	1	1/8 x 1/4 x 6	1
1/4 x 3/8 x 42	1	3/8 sq. x 8	1
1/4 x 1/2 x 36	1	3/4 x 1 x 2.5	2
1/4 x 1 x 30	1	3/8 x 3/4 x 3.5	1
1/4 x 1 3/8 x 36	4	3/4 x 1 1/4 x 1	2
3/8 sq. x 40	2	1/2 x 1.125 x 2.75 hardwood	2
3/8 x 1/2 x 30	1	3/4 sq x 6.5 hardwood	2
3/8 x 1 3/8 x 40	4	3/4 sq x 2.5 hardwood	1
3/8 triangle x 12	2	1/4 sq.x 4.75 basswood	4
1/2 triangle x 12	2		
1/8 x 1/4 x 26 basswood	2	<u>Other Parts</u>	
1/4 x 3/8 x 37 basswood	4	1/8 x 6 x 24 lite-ply parts	
		1/16 ply fuselage sides	
		Wing tube set	
		Plans	
		Main landing gear	
		Foam Cores	

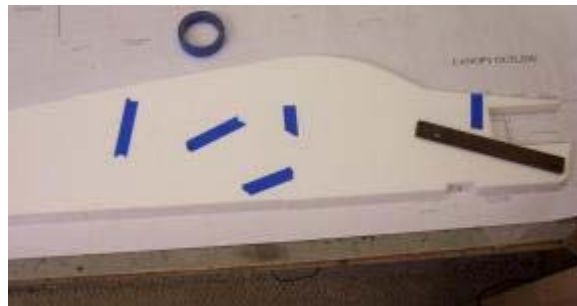
Materials required to complete kit:

- 4-40 pushrods w/clevises (5)
- control horns (5)
- 2-56 pushrod and clevis for throttle
- heavy duty hinges
- 6-32 x 2" socket head bolts (2) for wings
- 6-32 blind nuts (2) for wings
- 8-32 x 1.75" bolts, washers, and nylock nuts for main gear (2 sets)
- 3" main wheels
- Wheel axles or 8-32 bolts
- tail wheel and bracket
- engine, prop, and spinner
- fuel tank
- covering
- radio gear

FUSELAGE CONSTRUCTION:

Note that the various hatch and servo openings are not cut through the foam. This is to preserve the shape of the foam cores until the final construction steps where they will be completely trimmed out.

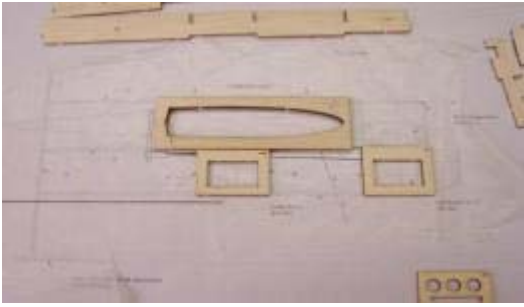
1. The fuselage is constructed by first gluing together the foam cores using either thin epoxy or a quality polyurethane glue such as Gorilla brand glue or ProBond. Use the plans as a guide but keep in mind foam can flex and compress a little so it may not match the plans exactly. **Note:** It is a good idea to go ahead and cut out the fuselage plans following the perimeter exactly as you will be using them frequently in the following steps. Tape the cores together at the seams while the glue dries. The edges will be blocked sanded prior to capping the perimeter.



2. Once the glue dries you will need to cut the servo wire tunnel into the right side. Use the plans as a guide and only cut the channel 1/2" deep. This does not need to be exact but use a straight edge and hobby knife to cut the channel. If you have a soldering gun a hot wire channel cutter can be made easily and is a handy tool to have. Flair the rear of the servo wire tunnel to blend into the tail section as shown on the plans. Do not worry about cutting the front hatch or landing gear block holes yet.



3. Assemble the tail group assembly using the plans and the laser parts provided. OMP recommends you trial fit all the pieces together first to be sure you understand the sequence. Pin the 1/4" balsa stabilizer support on the plans first and the two left hand servo mounts. Glue *t1* and *t2* in place over the stabilizer support and servo mounts. Now glue *t6* and *t7* in place over the rudder servo mount followed by *t3* across the bottom. Glue the two *t8* braces in and then the other 1/4" stabilizer support on top of the assembly. Slide *t4* and *t5* in place and glue with thin CA. Finally glue the right hand servo mount in place and the rear *t9* part.



4. Test fit the tail assembly into the rear of the fuselage foam core and when satisfied glue in place with epoxy or your favorite adhesive. Use tape to hold in place until the glue dries. Check the servo wire tunnels and cut any foam away so the openings in *t4* have a clear path.



5. Assemble the fuselage sides using 10 sheets of 1/16 x 4 x 42 balsa. True up the edges first using a long straight edge and a sharp knife trimming only what is needed to true the edges. Use the diagram below to lay the pieces out. Note how to cut the pieces to fit and keep the left over pieces of sheets 2 and 3 for the shear webbing. Tape each seam with masking tape to lock in the overall shape and then flip the whole sheet over. Using a flat sanding block, sand the seams flat as required, wipe off all sanding dust, and wick thin CA into each seam. Wipe the excess glue off with a paper towel quickly and turn the assembly over and remove the tape. If you prefer not to use CA adhesives, you should cover the plans with wax paper and assemble the parts using your favorite adhesive. Again, tape or pin the pieces in place over the plans to assure perfect alignment. When the glue cures lightly sand both sides smooth. Build both sides now,



6. **Note: Be sure your building board is flat and strong (won't sag) during this step!** It is very important to lightly sand the foam cores in order to remove the "skin" and allow the glue to penetrate better. Use the plans again as a guide to align the foam cores and make sure you have not curved the assembly in any way. Using polyurethane or your favorite foam adhesive, spread the glue evenly and thinly over the entire balsa sheeting and press down onto the foam core. Follow the instructions for the adhesive as some urethane glues can be misted with water on the opposing part to accelerate the curing and bond. Use a smooth hardwood block to slide along the sheeting as you press down firmly. This technique allows even pressure without poking through the sheeting. Repeat for the other side and then weight the entire fuselage assembly down with flat boards and weights such as water softener salt bags or bricks (about 200-400 lbs. is adequate). Place wax paper under and on top to prevent anything from sticking to the fuselage. It is strongly advised to pin the sheeting in place to the foam or anchor the perimeter when using some of the high quality urethane expanding glues. These glues can exert a lot of pressure and can actually slide the sheeting and weights off the edges.



7. When the fuselage sandwich fully cures, remove the weights and fuselage from your building board and trim the excess balsa away from the perimeter. Use a razor plane and sanding block to get the edges smooth. Trim out the engine mount area as well. Locate the area for the upper landing gear block using the plans. Using a sharp knife, cut all the way through the balsa sheeting and foam core. Clean up the lower landing gear block opening as well and test fit both blocks. Do not glue them in until the following step
8. The engine mounting width can be tailored to fit your engine choice. The foam core is precut to match the plans and engine width of most 1.60 size engines. If you need to widen, carefully cut the fuselage assembly symmetrically on top and bottom as needed. Plan carefully before you cut! OMP highly recommends using epoxy on engine mount assemblies, as CA can be too brittle for a high vibration environment. To make the engine mount, first cut the 3/4" sq. x 2.5" piece of hardwood provided to match your engine mounting width and glue between the two 3/4" sq. x 6.5" hardwood engine rails as shown on the plans. There are two laser cut 1/4" balsa rear engine mount supports. Find these and glue them together forming a 1/2" piece. Now glue this to the rear of the 3/4" hardwood beams. Next glue the 1/4" x 3/8" x 6.5" balsa pieces on the edges of the rails and finally glue the 3/8" x 3/4" balsa block over the top of the 3/4" hardwood crosspiece. When all the glue dries

give each edge a quick sanding. Test fit the assembly into the fuselage and when satisfied glue in place using 30 minute epoxy. Now is the time to glue the two landing gear blocks in as well. Place wax paper under and on top of the assembly and place a board and weights on top to assure all pieces stay true. Sand both sides smooth when cured.

9. Using the 1/4" x 1 3/8" balsa provided, cap the top and bottom of the fuselage. You will have to splice two pieces together to form the bottom piece and a small section at the rear of the turtledeck. It's best to splice the wood using 45 - 60 degree angles. To bend the balsa around the canopy area, cut small kerfs about every 1/2" or so half way through the balsa (foam side) using your razor saw (see photo for details). Wetting the wood with ammonia and water also helps to bend the balsa to the shape. Use polyurethane or your favorite adhesive and masking tape to securely hold the pieces in place until the glue dries. Cap the canopy and turtle deck in one long piece and then finish the front deck by butting the end of the balsa up against the bottom front edge of the canopy. This will help to hold the canopy balsa down while the glue dries. Finish with the front capping strips as shown on the plans. Note the lower chin area should receive two pieces of balsa to build up the radius.
10. Cut out the opening for the front hatch by using the plans or the left fuselage ply doubler as a guide. Use a sharp knife and cut the opening all the way through the both sides and the foam. Note the opening should be 3.5" wide so that it extends past where the 1/8" lite-ply hatch supports will reside.
11. Now it is time to glue on the 1/16" ply fuselage doublers. Before doing so note that the left hand doubler has the hatch opening and the right hand doubler has the throttle servo opening. Using a sanding block, line the trailing edges of the ply doublers on the edge of your table and sand the edges to a taper. This will make covering much easier. At this time glue the 1/8" lite-ply hatch supports to the inside of the left hand fuselage doubler so that they overhang the inside by 1/4". Test fit over the fuselage before gluing the doubler in place. It is very important that you get both sides properly aligned. The best way to do this is to glue one side on first using thick CA or epoxy, drill out the 3/16" wing mounting holes using a drill press, and then align the second ply doubler with those holes while gluing in place.



12. Cut out the openings for the tail servos, the stabilizer, the throttle servo (right side), the wing tube socket, and the wing bay hatches using a sharp x-acto knife. Test fit your servos now and fine trim the openings as required.
13. Cut a piece of wing tube socket roughly 1 1/4" long and test fit it into the fuselage. Use a square and the aluminum wing tube temporarily installed to assure it is square front to back and up and down. Glue in place using 5-minute epoxy and secure until the glue cures. Sand the entire fuselage smooth and set aside.



VERTICAL STABILIZER AND RUDDER CONSTRUCTION:

1. Construct the vertical stabilizer using 1/4" balsa framing as shown on the plans. Do not glue on the 3/8" x 1/2" rear post or the 3/8" leading edge fairing yet. Sand both sides of the frame smooth and sheet the fin with 1/16" balsa so that the grain runs parallel to the leading edge. Sand the edges smooth and then glue on the 3/8" x 1/2" rear post and the 3/8" leading edge fairing. Give the assembly a final sanding on both sides.
2. Now glue the vertical stabilizer to the rear of the fuselage making sure it is centered, tight against the top and rear, and straight up and down. Cut two pieces of 3/8" x 1/2" balsa sticks to fit on either sides of the fin post and glue in place. Make sure the top angle matches that of the turtledeck. Block sand the rear edge and glue in place the 3/8" balsa triangle stock again making sure it is centered side to side. Finally use a razor plane and sanding block to shape the rear of the fuselage to blend into the triangle stock. Note the pictures below show the 67" Fusion but the process is the same.



3. Locate the 1/8" x 7/8" x 3" lite-ply tail wheel mount, cut out the balsa required at the bottom rear of the fuselage, and glue in place as shown on the plans. When the glue has cured, sand the edges smooth.
4. Assemble the rudder using the 3/8" laser cut parts and 3/8" thick various balsa sticks as shown on the plans. Make sure all joints are tight and well glued. When the glue has cured, remove from your building board and sand both sides smooth. Glue the 3/8" balsa triangle to the leading edge making sure it is centered side to side. Trim the excess off using a razor plane and sand both sides smooth. Also sand all edges and sand the leading edge of the rudder and vertical stabilizer round. Be careful when sanding the fairing and gradually blend it into the top of the fuselage.



WING CONSTRUCTION

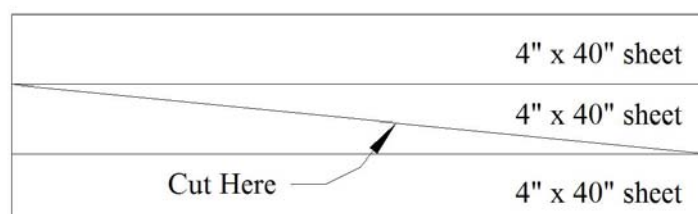
Note 1 - The Fusion wing is fully symmetrical and both panels are built almost exactly the same, upside down on your building board. The only real difference is the location of the servo mounts and wing tube. The Fusion has a flat top wing and the bottom tapers towards the tip.

Note 2 – Please be aware that the pictures below are those of the 67” Fusion. The 80” Fusion wings are built almost exactly the same with only a few minor differences.

1. The first thing we are going to do is assemble the unique ribs making sure we have both left and right hand parts. You are going to like how fast these wings can be built! Locate ribs R1A, R1B, R2-R9, R2A, R3A, R4A and B, and R5A. Make left and right hand stacks. Now glue together R1A and R1B making sure they are perfectly aligned. Glue the 1/16” ply donuts (note the plans say 1/8” lite-ply by mistake) onto the insides of R1B at the wing bolt locations. Glue on R2A – R4A to their respective ribs as shown on the plans. Again, make sure you assemble both right and left hand ribs. The aileron servo mounts are located on the bottom of the wing which will be on the top side of the ribs as you build it now. Glue the R4B and R5A pieces accordingly. **Hint: Now is a good time to glue in the 6-32 blind nuts to the inside of the right hand R1 assembly.**



2. Take three sheets of 1/16” x 4” x 40” balsa and edge glue them together as shown in the diagram below. One technique is to edge sand the sheets first, tape them together tightly, flip the assembly over and wick thin CA into the seam. Quickly wipe off the excess and sand smooth when dry. Now cut from corner to corner of the 4” wide center piece making both top and bottom sheathing for the leading edge.



3. Mark the rib locations accurately on the 1/4" x 3/8" basswood spars and 3/8" sq. balsa leading edge. Lay out the wing plans and cover them with wax paper. Take one of the leading edge sheets you just made and place it over the plans so that the rear edge covers half the width of the main spar. The 4" wide continuous sheet should be toward the leading edge and the 4" angled piece against the spar. You will notice the ends of the sheeting will be angled relative to the ribs so make sure you have the sheeting centered enough to cover both ends. This technique places the seam on the top "less convex" portion of the ribs. Now pin one of the 1/4" x 3/8" basswood spars on top of the sheeting so it overhangs the sheeting by 3/16". Once properly pinned in place, wick thin CA into the joint.



4. Place all the ribs onto the bottom spar and pin in place through the rear alignment tabs. Make sure each rib is exactly at 90 degrees to your building board and glue to the bottom spar using thin CA. Be careful not to glue the leading edge sheeting yet until you get a chance to pull it up later on.



5. Now glue in place the top and leading edge spars that you marked earlier and the four 1/8" x 1/4" trailing edge spars. Make sure you keep the ribs square to the building board and in proper alignment. Also glue in place AR1 and AR10 to the trailing edge spars as shown on the plans. Make sure you have these aligned properly and pin them in place through the bottom tabs.



6. Using pieces of 1/16" x 4" x 36" balsa, cut and glue in place each of the shear webs as shown on the plans using thick CA. You will have to add some extra pieces to complete the shear webbing all the way between ribs 1 through 4. Make sure you have adequate glue joints on all shear webs and ribs and that R1 is at exactly 90 degrees to your board as this step will lock in the rib positions. Also slide in one of the wing tube sockets and glue to each rib and shear web with adequate glue joints. The outboard end of the tube should be flush with R4A as shown on the plans. Finally glue a scrap piece of 1/8" balsa over the tube end and R4A to act as a wing tube stop. It helps to poke a small hole in the

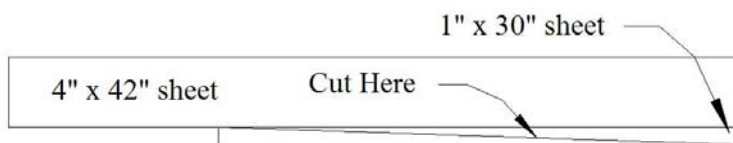
center of this piece to allow air to escape when inserting the wing tube. The strength of the wing depends on the glue joints between the wing tube socket, ribs, and shear webs so double check your work.



7. Carefully sand the glue joints at the 3/8" sq. leading edge (top and bottom) and the joints at the top and rear spars. Use a long flat sanding board and be careful not to break any of the joints.
8. Now you are ready to pull up the leading edge sheeting and glue to the ribs and leading edge spar. It is critical that you maintain R1 in it's correct position: square to the building board and perfectly straight front to back. You can temporarily pin alignment blocks to your building board to position the front of the rib or use a straight edge along the ribs length to assure it is flat. Gently pull up the bottom sheeting and glue to the leading edge stock using thick CA. You can soften the wood with water and/or ammonia to aid in bending it over the leading edge if required. Hold in position until the glue dries and be careful not to pull the ribs out of alignment. Wick thin CA between the sheeting and the ribs to secure these locations. Trim off the excess sheeting and sand flush to the 1/4" sq. leading edge stock.



9. Using thick CA, glue one of the 1/16" x 1" x 40" trailing edge sheeting on top of the ribs as shown on the plans. Make sure the rear edge is flush or overhangs slightly with the back of the 1/4 x 1/8" stock. Minor differences will be sanded flush later. Form the aileron sheeting by gluing a piece of 1" x 30" balsa to the bottom of a 4" x 42" sheet as shown below. Cut the 1" x 30" sheet diagonally from the lower right corner to the top left corner as shown. Save the left over piece and glue it to another 4" x 42" sheet to form the top sheeting for the aileron. Set this aside for later on. Glue the aileron sheeting on using thick CA. Make sure you are flush or slightly overhang the 1/8" x 1/4" leading edge spar. You will sand this flush to the spar later. Be careful not to distort the shape and end rib positions and also make sure you hold the sheeting flat so all glue joints are tight.



10. Take the other piece of leading edge sheeting you cut in step 2 and glue in place over the front of the wing using thick CA. Test fit the piece first and like the bottom piece, position the rear edge half way over the main spar. The 4" wide continuous sheet should be toward the leading edge and the 4" angled piece against the spar. You will notice the ends of the sheeting will be angled relative to the ribs so make sure you have the sheeting centered enough to cover both ends. If needed use water and/or ammonia to aid in bending it over the leading edge.



11. Sheet the inboard two wing bays using 1/16" x 4 x 36 balsa provided. Cut to 9" lengths and edge glue together. Edge glue three pieces together, sand the sheeting smooth, lay over the wing, mark and trim accordingly. Save the left over angled piece and glue on additional 9" long pieces for the other side. This makes efficient use of the wood. When satisfied with the fit, glue in place using thick CA.
12. Build the servo bay area by gluing in place two of the 1/4"sq. basswood rails into the precut notches in R4 and R5. Trial fit your servo and cut and glue in place a piece of 1/4" sq. balsa between the rails to support the sheeting. Sand smooth once the glue cures. Build the sheeting using pieces of 1/16" x 4" sheeting left over from the above steps. Cut two pieces 4.75" long and edge glue them together. Sand smooth, lay over the wing, mark, and trim to fit. When satisfied, glue in place using thick CA.



13. Cap off ribs R6 – R9 using the 1/16" x 3/8" balsa provided. The rib cap on R9 should be flush with the outboard edge of the rib. This completes this side of the wing. Remove from your building board and flip the wing over. Be careful not to break any of the glue joints around the aileron area when removing the wing. Trim off the rib alignment tabs and gently sand any irregularities on all joints.
14. Glue the other 1/16" x 1" balsa trailing edge sheeting again making sure the rear edge is flush or slightly hanging over the 1/8" x 1/4" spar. Minor differences will be sanded flush later.
15. Now sheet the two inboard wing bays using the pieces left over from the other side and as described in step 11 above. Cap the remaining ribs using the 1/16" x 3/8" balsa provided.

Note: We are now going to complete the aileron construction but it is important to keep the aileron straight and flat against your building board when completing the top sheeting. Since the leading edge sheeting of the wing completes the "D-tube" construction, the shape of the wing is locked into position and very stable. Simply hold the trailing edge of the aileron flat against your building board for these next few step.

16. First glue in place the 1/16" x 1/4" balsa strip to the bottom sheeting and against the rear edge of the ribs. You will have to use more than one piece. Locate the 3/4" x 1 1/4" x 1" balsa block and block sand the bottom and inboard sides to fit snugly against the leading edge spars, bottom sheeting, and R5 rib. Note the grain must run vertically on this piece. Test fit and sand slowly and when satisfied, glue in place with thick CA. Use a razor saw and sanding block to cut off the excess at the top and sand smooth with the surrounding structure.



17. Glue the aileron top sheeting that you made in step 9 in place using thick CA. Make sure you are flush or slightly overhang the 1/8" x 1/4" leading edge spar and that you keep the aileron flat against your board while the glue dries. When dry, cut the aileron off of the wing using a razor saw to cut through the ribs between the wing and aileron. Carefully sand the trailing edge of the wing and leading edge of the aileron smooth and flush with the 1/8" x 1/4" spars.

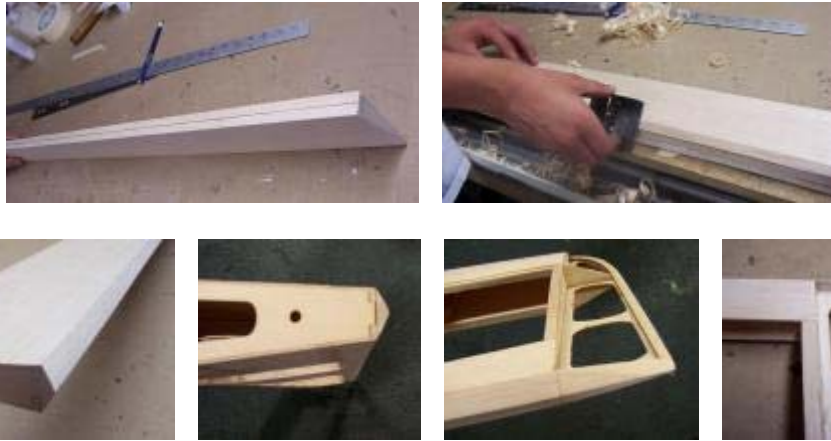


18. Locate the 3/8" x 1 3/8" x 40" balsa provided and glue one each to the trailing edge of the wing and the leading edge of the aileron. Make sure all glue joints are flush and block sand if needed. Also make sure you allow the stock to extend past R9 for the wing tip assembly.

19. Locate the laser cut pieces for the wing tip (wing tip and two outboard doublers). Glue one doubler to the top and one to the bottom as shown in the photo and then glue the assembly to R9 and the wing trailing edge stock making sure it is centered on the trailing edge piece. Glue the top and bottom triangle braces in place as shown on the plans and photos. Finally cut the excess trailing edge stock off and sand flush to the wing tip.



20. Use a razor plane and sanding block to shape the leading edge of the wing. Also remove the excess balsa stock at the trailing edge with the razor plane and sand flush to the wing sheeting. Taper the trailing edge stock at the wing tip to blend into the tip smoothly. Draw a straight guide line through the center of the wing trailing edge and shape with a razor plane and sanding block. Keep your razor plane and sanding block at a constant angle to assure accuracy. Use the front corners of the 1/4" balsa stock as a guide for your angles. Repeat the same procedures for the aileron.



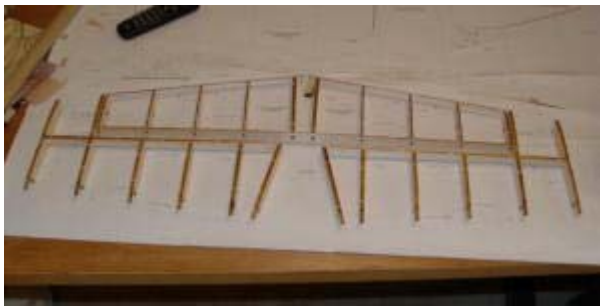
21. This completes one wing and aileron construction. Repeat for the other wing panel and when complete, give each panel a good final sanding in preparation for covering. Make sure the leading edge is sanding round as shown on the side view on the plans. The leading edge should become somewhat sharper toward the wingtip but still remain round.
22. The final step is to build the hatches in the left hand wing panel. You can build these on either the top which is more convenient for assembly/disassembly or on the bottom which hides them from view. Locate the laser cut 1/16" ply hatches and use them to trace out the opening as shown on the plans. Carefully cut the balsa sheeting out and sand the edges just slightly enough to allow for covering clearance when the hatch is installed. Glue a small piece of 1/16" balsa on the bottom front edge of each hatch so that the grain runs left to right. Now cut and glue two pieces of 1/8" x 1/2" balsa under the front and rear edges of the wing sheeting to form support lips. Repeat for the other hatch opening. Finally locate the laser cut 1/8" lite-ply screw down plates and glue these under the outboard lip of the wing sheeting as shown on the plans. Test fit the hatch and trim if necessary. Secure in place with one small screw each. The wings are attached to the fuselage using the 6-32 socket head bolts inserted through the left wing, through the fuselage, and into the blind nuts of the right hand wing.



HORIZONTAL STABILIZER AND ELEVATOR CONSTRUCTION:

1. The stabilizer and elevators of the 80" Fusion are built up and airfoiled in a similar fashion as the wings. Locate the laser parts for the stabilizer and pin all ribs to your building board. Cut two 1/8" x 1/4" basswood spars to length and insert into the slots in each rib. The lower spar will have to be slid from underneath one end. Using a square make sure each rib is 90 degrees to your board and then glue the spars in place using thin CA.

2. Test fit the SS1 And SS2 sub leading and trailing edges in place and gently sand the center joint between the two leading edge parts so they fit nicely together in the middle. When satisfied glue in place using thin CA. Locate the laser cut 3/8" leading edge joiner and glue in place as shown in the plans. Make sure it is centered top to bottom.



3. Using a large flat sanding block carefully sand the top of the stabilizer and sheet with 1/16" x 4" balsa using thick CA. You will have to edge glue two pieces together to cover the entire stab. When cured removed the assembly from your building board.



4. Sand the bottom of the stabilizer as before and prepare the sheeting as in step 3 above. It is important to block up the stabilizer symmetrically on both sides when sheeting the bottom. This will prevent any twist from being introduced. Use scrap pieces of balsa wedged under the leading and trailing edges on both ends and again be sure you are symmetrical on both ends. When ready, sheet the bottom side using thick CA.
5. Sand all edges smooth using a flat sanding block and cap off the leading edge using 1/4" x 1/2" balsa. Cut the appropriate angle in the center so both pieces meet tightly together. Cap the trailing edge using 1/4" x 1" balsa. When cured, use a razor plane and sanding block to smooth out and shape the entire stabilizer. Using a similar technique as with the aileron hinge stock, first draw a center line on the trailing edge of the stabilizer. Then draw lines on the top and bottom roughly 1/8" forward of the trailing edge. This represents half the width of the trailing edge stock. Now use a razor plane and sanding block to shape the hinge line as shown in the cross section diagram on the plans.
6. Locate the laser cut parts for the elevators and pin in place over your plans. Make sure all ribs are 90 degrees to your building board. Test fit the leading edge (ES1) and glue in place using CA. Note E5A and E5B will be glued into the same hole on ES1.
7. Cut a piece of 1/16" x 1" balsa to length and glue to the bottom of the rib trailing edges. Now glue a piece of 1/16" x 1/4" balsa on top of this and flush to the back of the ribs. Give the top section a quick and careful sanding with a long sanding block and then glue the top 1/16" x 1" sheeting in place over the leading and trailing edges.
8. Carefully sand the leading edges of E5A and E6 at the proper angle and glue on the 3/8" x 1/2" balsa leading edge. Two laser cut corners (ecb) are provided for each elevator counterbalance. Glue each pair into the corners as shown on the plans. They will be sanded to shape later. Finally cut and glue in place the 1/8" x 1/2" balsa cross bracing in each counterbalance.
9. Remove the elevators from your building board and trim off the alignment tabs on the bottom. Locate the 3/4" x 1" x 2.5" balsa blocks and shape to fit in-between E1 and E2 as shown on the plans. You will have to shape the inboard edge and the top and bottom to match the rib angles and fit flush below the 1/16" sheeting. When satisfied glue in place using CA.
10. Finally glue on the remaining 1/16" x 1" sheeting into the leading edge notches. When cured, sand all edges of the elevators smooth and shape the "ecb" corners and leading edge of the counterbalances. Glue the 1/2" balsa triangle stock making sure it is centered top to bottom and sand to blend into the elevators. This completes the elevators.



COVERING and FINAL ASSEMBLY: (Note some pictures are from the 67" Fusion)

You will require 6 servos for the 80" Fusion. OMP recommends high quality metal gear servos with at least 130-150 oz of torque per surface. We have found that massive ailerons can be even more responsive with 180 oz plus servos. The throttle servo cutout will accommodate most mini servos such as the Hitec 85mg servo. To take full advantage of the flight performance, a radio system with mixing capabilities is best. This will greatly enhance the maneuverability of your model. A good example would be coupling the elevators to the flaps. This can be done in both directions. For example you can mix up flaps with down elevator (and vice versa) for really tight turns or loops. This is commonly referred to as "flaperons" and requires the aileron servos to be plugged into separate channels, usually 1 and 6. You can also mix up flaps with up elevators for quick descent elevators; this is referred to as "spoilerons".

1. Cover all the parts first and then assemble the model. The plans conveniently provide guide lines through the center of the stabilizer that can be used to align your covering while leaving the center bare. After covering, cut open and iron down the edges of all the servo and hatch openings. Also be sure to seal any exposed wood with a thin coating of epoxy to prevent engine oil from soaking in. This is especially important around the engine compartment and servo openings with exposed areas. OMP recommends sealing the hinge gaps using strips of appropriate covering or clear trim tape after final assembly.

2. Two guide holes are provided in the ply fuselage doublers for mounting the main landing gear. Drill these all the way through to accept a 8-32 bolt. Match drill the gear provided and secure to the fuselage using 8-32 x 2.5" socket head bolts and nylon insert lock nuts. Mount 3" wheels by installing a 8-32 x 2" socket head bolt into the wheel, installing a 8-32 nut on the bolt (tighten just enough to allow the wheel to spin freely), inserting into the gear and securing with a 8-32 nylon insert lock nut on the inside. Mount a suitable tail wheel assembly to the hardwood mount in the rear of the fuselage. Hint: harden the screw holes with thin CA before final mounting.



3. Using your favorite brand of heavy-duty hinges, pre-hinge the control surfaces making sure you cut the slots for each hinge dead center on the hinge stock. Use four hinges for each elevator half, four hinges for the rudder, and about 8 hinges for the ailerons. Trial fit each surface into its respective part and when satisfied, glue each hinge only into the control surface side and set aside for later.

4. If the stab is covered all the way, be sure to cut away the covering (1 1/8" wide) in the center for the glue to adhere properly. **Be extremely careful not to cut any of the wood or you will weaken the stabilizer and cause possible failure!** Temporarily install the wings and fit the stabilizer into position. Use string to measure from the stab corners to a common point near the front of the fuselage or the wing tips. A carpenter's square can also be used to align the stab TE to the fuselage side. Also make sure the stab is parallel to the wings. Sand or file as necessary. When satisfied with the fit, glue in place by wicking thin CA into the joints again making sure the stab is correctly positioned as described above. You can add a small filet of glue at the fuselage/stabilizer joint using thick CA or your favorite adhesive.



5. Permanently glue in each control surface making sure the hinge gaps are as tight as possible while still retaining maximum throw.

6. Assemble your fuel tank (12 - 14 oz nominal) per the manufacturer's instruction and mount on the left side of the fuselage centered behind the engine mount. Place the tank in position and drill two sets of holes about 4 inches apart on the top and bottom sides of the tank. Mount the tank using zip ties and be sure to use a piece of foam between the tank and fuselage to reduce foaming.



7. OMP recommends high quality control horns such as Dubro brand which mount all the way through the control surface. Drill each location accurately using the photos and plans as a guide. Use the plans to remind you where the aileron horn mounting location is. Again, harden the mounting holes by wicking thin CA into the holes prior to final installation.



8. Install the aileron servos in the wing using extensions as required. Finish the control linkage setup using 4-40 pushrods and clevises or ball links. OMP recommends high quality control linkages to minimize any slop. Make a small cable clamp out of scrap balsa to help hold the end of the servo wire near the root of the wing.



9. Install the tail servos into their respective sockets as shown in the pictures above and pull the wires through the tunnel by taping the ends to a piece of long nylon pushrod or similar semi-flexible wire. OMP recommends putting tape or string around servo wire connections to prevent accidental detachment. Mount the servos to their respective sockets and complete the controls using high quality pushrods, clevises and ball links.

10. Install the throttle servo into the opening you made in the right hand side of the fuselage. Feed the wire through the tunnel provided in the foam and into the receiver hatch area. Use an extension if required and pull it through the tunnel using a string or nylon pushrod taped to the servo lead.

11. Trial fit your engine and mark the location for each mounting hole. The location can be moved forward or aft depending on balance requirements. **Hint: Use rubber bands to hold the engine in place while you check the CG. Be sure you have the prop and exhaust system on while you check.** Drill the holes and mount your engine using bolts and blind nuts. Use thin CA on the inside of the holes to harden them up. You should use a couple of wedge plates or washers under the front of the engine to induce about 2 degrees of right thrust. Use a 2-56 pushrod and nylon clevis to finish off the throttle linkage. Make sure you have the proper throws set for idle and full.



12. Check you CG one more time and decide where you want to mount the receiver and battery. The preferred location for the receiver is either in the forward or aft fuselage hatch between the wing panels. One way to accomplish this is by gluing a flat piece of lite-ply on the top surface of the opening and securing the receiver with tie straps or Velcro. The battery can be mounted either in the front hatch (default location), the two locations between the wings, or in the left wing. If mounting in the wing, be sure to secure thoroughly. The switch can be mounted in the hatch cover (note you can dig out some foam under the sheeting and slide the battery forward or aft as well to allow more room for the switch), anywhere under the fuselage sheeting, or in the wing sheeting next to the battery. If mounting the battery in the wing, a "Y-harness" can be used from the output of the switch to both the aileron servo and the aileron servo channel of the receiver. This technique is widely popular for large profiles and maintains only one connection between the wing and fuselage.



13. This aircraft is extremely aerobatic! The Fusion X3D was designed to fly pattern and IMAC style maneuvers as well as 3D extremely well. If you are not used to flying an extremely responsive aircraft you should set the initial throws to under 30 degrees of movement for the elevator and rudder and about 20 degrees for the ailerons. This represents a good setting for getting started. More experienced pilots will want to set the throws to as much as 45 degrees or more for high rates on the tail surfaces. The airfoiled ailerons are very effective and thus 30 degrees or so deflection is adequate here. The use of dual rates and exponential is highly recommended for most pilots. For flying precision aerobatics, it is important to have the proper amount of throws for each type of maneuver. Many experienced pilots will set different mode switches or rate switches accordingly. For example there may be a mode just for doing snaps while another mode may be used for performing spins. We have found that the following settings provide a good initial setup for pattern work. These settings can be used for your low rate settings while high rates are reserved for 3D only. Always check the functions, range, and proper directions of your radio setup prior to flying.

	Low Rate	High Rate
Elevator	12 degrees	45 degrees
Rudder	25 degrees	45 degrees
Ailerons	20 degrees	35 degrees

BALANCING:

Most state of the art aerobatic aircraft allow for a wide margin for balancing depending on what level of precision or freestyle the pilot prefers. To perform properly without being too squirrely, you must not go too aft on the CG. **OMP recommends an initial CG setting of 9.5 - 10 inches behind the leading edge of the wing at the root.** More experienced pilots may want to set the CG further aft. Varying weights of engines and radio gear will dictate how you should install each. The engine can be moved forward or aft on the engine mount to shift weight. Also the battery and receiver can be located in any of three hatch locations in the fuselage. The battery can also be mounted in the left wing along with the switch and a "Y-harness" to the left aileron servo. Since the fuselage is foam core it is relatively easy to cut another hatch in the fuselage along the servo wire tunnel and build another hatch for the battery if you absolutely must locate the battery even further aft. These options should allow you to balance the model without adding any weight.

Note: The best way to check your balance is to trim for level flight in the air and then roll inverted. The aircraft should maintain level flight with very little to no down elevator. If the aircraft climbs when inverted then you've probably got your CG too far aft.



Again, thank you for purchasing the OMP 80" Fusion X3D Profile. If you have any comments or questions about this manual or the aircraft please email "sales@ohiomodelplanes.com".

OHIO MODEL PLANES

199 Stratford Lane

Xenia, Ohio 45385

(937) 372-0603

www.ohiomodelplanes.com