OHIO MODEL PRODUCTS

67” FUSION X3D

Instruction Manual

Wingspan: 67"
Wing Area: 1000 sq. in.
Length: 66 1/2"
Approx. Weight: 7.25 lbs.
Engine: .91-1.20 2-strk, .91-1.25 4-strk

OHIO MODEL PRODUCTS, 199 Stratford Lane, Xenia, Ohio 45385, (937) 372-0603
www.ohiomodelplanes.com

Thank you for purchasing the OMP Fusion X3D Profile. In our continuing effort to bring the best in performance to our customers, we have expanded our successful fun fly fleet to include the first pattern style profile here in the USA. The Fusion was designed to perform precise and crisp pattern and IMAC maneuvers effortlessly yet still retain the capability to let out all the stops for ultimate 3d flying- thus the "X3D" class is now born! Through exhaustive research and development, the Fusion was finally realized and has exceeded even our expectations. Now you can evolve your flying skills to a new level without having to spend a fortune on an expensive pattern or IMAC airplane. The Fusion offers the best of both worlds to the sport flyer at every level. You can learn precision and 3D aerobatics at a very reasonable cost using reasonably priced radio equipment and readily available .91 to 1.25 size sport motors. Our Fusion 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. I hope you will enjoy the Fusion X3D Profile as much as we have – *Mike Pilkenton and John Drake.*

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 is 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 at the date of purchase. This does not cover any parts damaged by use, misuse, modification, or long term storage. 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 this model by the user. By the act of using the final assembled model, the user accepts all resulting liability. If at the time of purchase, you should find any missing or damaged parts, or have any questions about this product, please contact us at **omp@ohiomodelplanes.com** or call OMP at (937) 372-0603.

ENGINES, PROPELLERS AND MUFFLERS

The recommended engine range for the Fusion X3D is a .91 – 1.20 two-stroke engine or a .91 to 1.25 four-stroke engine. There are a tremendous variety of engines available and each type has its own advantages and disadvantages. Selecting the proper size of propeller for your particular engine is a very important part of the whole set up. The Fusion, as all high performance 3d aircraft, was designed to use low pitch props. What you need is air flow 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 loose 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.

<u>Note:</u> As with all kits, it's a good idea to read all the instructions and study the parts 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.

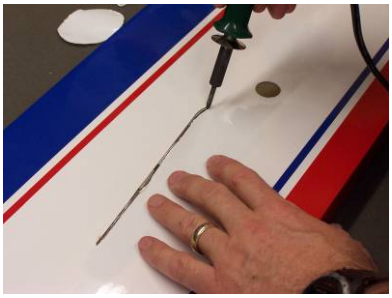
<u>Also note</u> that the assembly pictures are from both the Fusion ARF and various kit builds however the assembly process is the same.

<u>Building Supplies and Tools Required to Complete the Model:</u>

- Thin and Medium CA
- CA Accelerator
- 5 minute Epoxy
- Hobby knife
- Screwdrivers
- Covering iron
- Engine and Prop
- Radio Gear

<u>COVERING:</u>

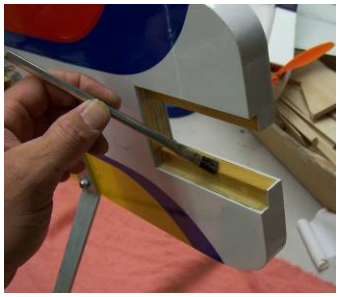
1. OMP recommends lightly going over all the covering with a covering iron set at medium temperatures. With all ARFs, varying temperatures and transport delays can cause covering material to loosen over time and transportation. Pay attention to all covering seams and make sure all are properly adhered to the model.
2. Carefully cut the covering away from the various openings on both sides of the fuselage. Servo openings should be cut from corner to corner and the covering ironed down on the inside. Only cut the throttle servo opening on the right side of the fuselage. Other holes can be cut out using either a sharp hobby knife or the tip of a hot soldering iron. The latter technique acts to seal the covering edges as you cut away.



3. Cut the covering away from the hatch opening in the wing and iron down the covering around the perimeter. A precovered hatch is provided which can be secured with 4 screws. Do not cut the covering away from the front fuselage hatch opening until you balance the model and determine that you might need more nose weight. Most Fusion setups will not require use of this hatch area. If you do require the use of this hatch, cut the covering and iron down aroouns the perimeter. A precovered hatch is supplied which is secured with 4 screws.


4. 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. The Fusion

ARF already has a factory applied coating of epoxy around the engine mounting area. If you need to widen the engine mounting rails be sure to reseal the wood.



5. Some modelers prefer to seal the hinge gaps using strips of appropriate covering or clear trim tape. We have found this to be helpful with models intended for higher speed flight or models with unusually large hinge gaps. OMP profiles utilize a very tight double beveled hinge line and do not normally require this step. Sealing the hinge gaps is therefore left as an option for the modeler. If desired this can be accomplished using strips of clear covering applied along the hinge lines after the surfaces have been installed.

RADIO SELECTION:

You will require at least a 6-channel radio system with 5 standard size servos and one mini size servo for the throttle. The Fusion can use servos ranging from 70 in-oz of torque up to 130 in-oz high speed digitals. The use of higher speed more powerful servos will allow the pilot to fly the Fusion much more aggressively for advanced aerobatics and 3D performance. 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 vise 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".

AIRFRAME ASSEMBLY:

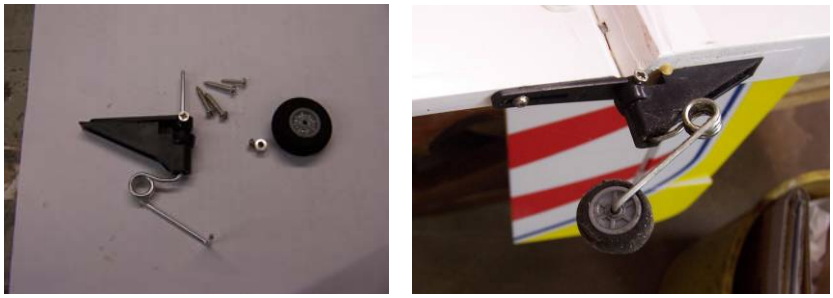
1. Hinge points are provided for this model and the holes have been pre-drilled by the factory. Test fit the hinges and rudder and make sure it operates freely with no binding. When satisfied glue the hinges in place using epoxy. Hint: clean the hinges first with isopropyl alcohol to remove any plastic mold release agent prior to gluing in place. Use a toothpick or small piece of old pushrod to coat the inside of the holes and the hinges prior to installation. Make sure your hinges rotate freely at 90 degrees to the surface and are centered on the hinge line. Install the rudder and make sure the hinge line is tight. Thoroughly clean any excess epoxy away from the hinges using isopropyl alcohol and paper towels. Use masking tape to hold the control surface in place with a tight hinge line while the glue cures.



2. Locate the partsfor the main landing gear. Two guide holes are provided in the fuselage for mounting the main landing gear. Cut the covering away from these holes and mount the main landing gear using the supplied bolts, washers, and lock nuts. Mount the wheels to the main gear by installing the supplied bolt (bolt has a smooth shank on it) into the wheel, installing a nut on the bolt (tighten just enough to allow the

wheel to spin freely), inserting into the gear and then securing with a nylon insert lock nut on the inside of the gear.

3. Install the tail wheel onto the tail wheel assembly and secure in place using the supplied wheel collar. Insert the wire end into the bottom of the bracket and secure the steering arm as shown using the supplied wheel collar and screw. Cut off any excess wire from the top of the assembly. Mount the tail wheel bracket to the hardwood mount in the rear of the fuselage making sure the pivot point is aligned with the hinge line of the rudder. Hint: harden the screw holes with thin CA before final assembly. The steering arm is secured to the bottom of the rudder using a small wood screw. Again, be sure to harden the hole with thin CA prior to final assembly.

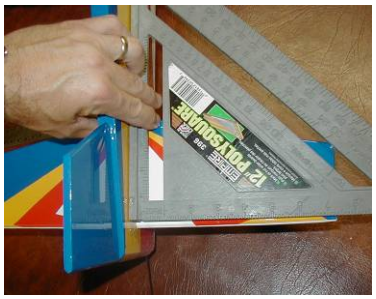


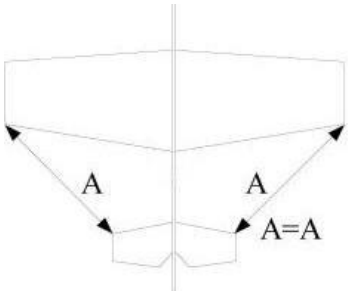
4. Install the carbon fiber wing anti-rotation pins into the fuselage making sure they are centered and extend equally on both sides of the fuselage. Also make sure the pins are square to the fuselage. Once these pins are centered and square, wick thin CA around the joints on both sides of the fuselage. It is also helpful to round off the ends of the pins to aid in installing the wings.

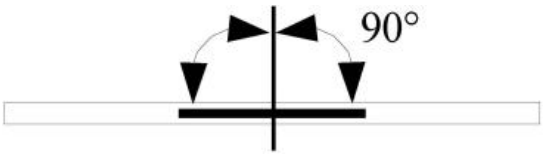
5 Temporarily install the wings onto the fuselage making sure they are fully seated onto the fuselage. Tighten the center wing bolt to make sure the wings are tight and square to the fuselage. The center bolt is inserted through the left wing hatch and passes through the root rib, fuselage, and into the blind nut in the right wing.

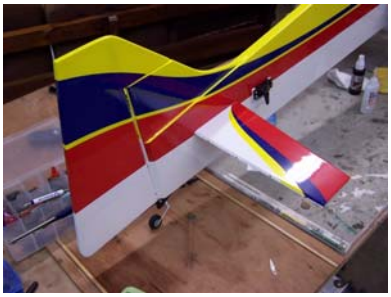
6. Install and center the stabilizer making sure it is square to the fuselage and centered from side to side. Use a T-square on the side of the fuselage to align the trailing edge of the stab or you can measure from the wing tips to the corners of the stab to assure proper alignment. This distance should be equal on both sides. Mark the fuselage outline around the stab covering using a pen or pencil and then remove it. Cut the covering material away from the center of the stab just inside of your pen marks. Use a sharp x-acto blade and be extremely careful not to cut any of the wood or you will weaken the stabilizer and cause possible failure!











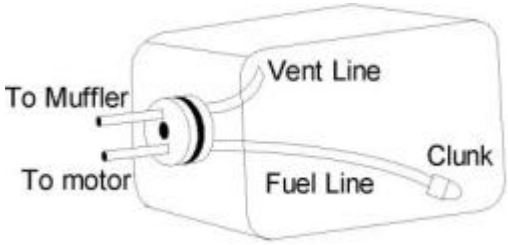
7. Now reinstall the stabilizer and be sure it is properly aligned, parallel to the wing, and centered in the fuselage. Hold in place using tape and/or pins. When satisfied glue in place by wicking thin CA around the joint. If desired, you can add a small filet of glue at the fuselage/stabilizer joint using thick CA or your favorite adhesive.

8. Once the glue has cured from the stabilizer you can remove the wings. Test fit the elevators using the supplied hinges to check the fit. When satisfied, glue the hinges in using epoxy and the same technique as you did for the rudder. Make sure the hinges rotate freely 90 degrees from the surface and and are centered on the hinge line. Clean off any excess glue and tape the elevators in place while the glue dries.


9. Now install the ailerons using the supplied hinges and the same technique as you did for the rudder and elevators. Double check the operation and tape the ailerons in place until the glue cures.

ENGINE, TANK, AND RADIO GEAR:

1. Locate the fuel tank and assemble the stopper, fuel lines, and tank clunk according the photo below. Carefully bend the vent line upward toward the top of the tank. Mount the tank to the fuselage using the two tie wraps and foam padding to reduce fuel foaming.

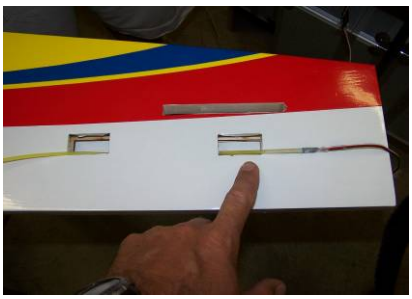
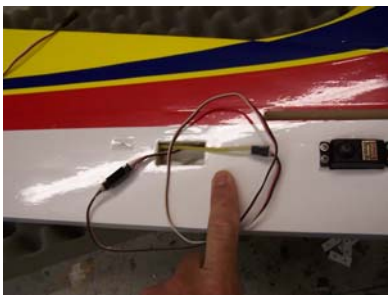
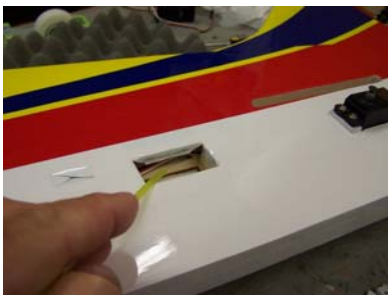
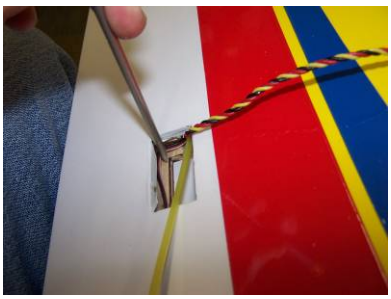
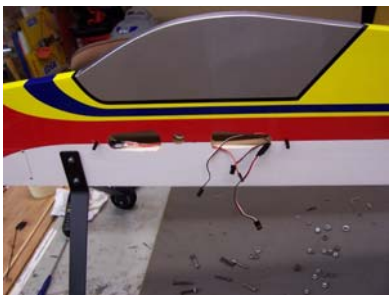


2. Install the throttle servo into the opening in the right hand side of the fuselage. The cutout is sized for a typical mini servo. If required, trim the opening larger to fit your servo. Feed the wire through the tunnel provided and into the receiver hatch area. Use an extension if required and pull it through the tunnel using a string or nylon pushrod taped to the servo lead. **Note:** As of this production run the factory did not laser cut the hole in one of the balsa braces for the servo wire to enter the front wing hatch area. Use an x-acto knife and simply cut a hole in the balsa brace just in front of the front wing hatch opening as shown in the photo below. Your servo wire can be fed through the hole using an old nylon pushrod or similar tool.

3. Install the aileron servos in the wing using extensions as required. Install the supplied control horns into the ailerons making sure you have proper geometry between the pushrod and servo. The aileron control horns should be mounted so that the center of the horn is about 13 1/2” from the root of the wing. This should be the center of the hardpoint. Mark the location for the control horn bolt and drill a hole in the aileron making sure it is straight up and down. Harden the hole with thin CA prior to final installation of the control horn bolt. Thread the coupler onto the end of the bolt and finish the control linkage setup using the 3 mm pushrods and balllinks provided. Hint: Make a small cable clamp out of scrap balsa to help hold the end of the servo wire near the root of the wing.




4. Install the tail servos into their respective sockets 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. Tape over the connectors will also prevent the sharp plastic corners from getting snagged inside the tunnel. The rudder servo wire is fed through a hole into the elevator servo opening with a small access hole located between the two elevator servos. Prevent the wires froim getting pinched during your servo installation and feed all wires forward into the aft fuselage opening between the wings.

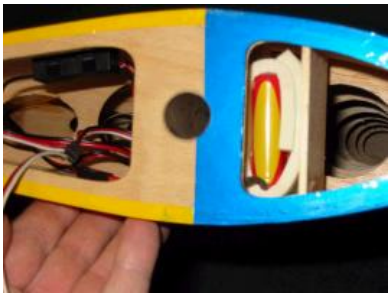






5. Install the supplied control horns in the elevators and rudder. It is a good idea to harden the mounting holes with thin CA prior to final installation of the horns. Finish the control linkages with the supplied pushrods and clevises and ball links.

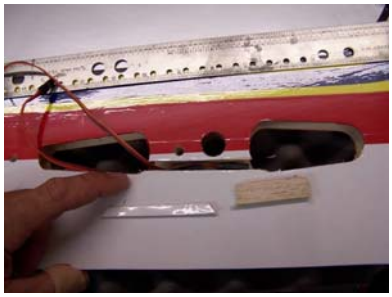

6. Now is a good time to check your cg and decide where you want to mount the receiver, battery and engine. Trial fit your engine and mark the location for each mounting hole. The location can be moved forward or aft depending on balance requirements. A tip is to use rubber bands to hold your engine in place while your check the c.g. Make sure you have the muffler and prop on the engine to get an accurate measurement. Once you have determined the engine placement, drill the holes and mount your engine using the supplied bolts, washers, and locking nuts. Use thin CA on the inside of the holes to harden them up. You may wish to add about 2-3 degrees of right thrust by adding washers or wedge plates under the engine before mounting. Finally complete the throttle pushrod using the supplied 2 mm pushrod and clevis. Make sure you have the proper throws set for idle and full. Install your muffler, prop and spinner.



7. 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, 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, 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.



8. Manual Addendum: As of this production run the factory has not included a tunnel to route wires between the front and aft fuselage openings. If you plan on installing the receiver in the aft fuselage opening behind the wing tube and routinely removing the wings, you will need to cut a slot in the fuselage under the wing tube to allow the throttle servo wire to pass through to the rx. This is a simple modification that can be done with a straight edge and your hobby knife. Lay your straight edge across the bottom of the two fuselage openings and cut a slot through the 1/16” ply siding and balsa filler block. The slot only needs to be 1/4” wide and about 1/2” deep. After cutting two lines, pop out the piece and cut the plywood sheeting away from the balsa block. Re-glue the ply piece back in place using CA. This structure is very strong here so do not worry about weakening this area.



RADIO SETUP:

This aircraft is extremely aerobatic! The Fusion 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 25 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 30-35 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 and 3d work. Use the low rates for pattern and the high rates for 3D. 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	25 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 squirrelly, you must not go too aft on the CG. **OMP recommends an initial CG setting of 8 - 8.5 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. 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 Fusion X3D Profile. If you have any comments or questions about this manual or the aircraft please email "omp@ohiomodelplanes.com".

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