

# *OUTLAW*

## *Delta Wing ARF*

### Instruction Manual



***EXTREME FLIGHT*** ✓  
***RADIO CONTROL™***  
STATE-OF-THE-ART R/C AEROBATIC AIRCRAFT AND ACCESSORIES

Thanks for your purchase of the Extreme Flight RC Outlaw Delta wing ARF. Designed by 9 time NCFFA champion Jerry L. Smith of Paducah Kentucky, the Outlaw is a very unique high performance aircraft that possesses a very wide flight envelope and is capable of some very interesting maneuvers unique to this design. Jerry has been flying this aircraft on the air show circuit for several years now and it always gets the crowd fired up and asking “where can I get one?” Previously the Outlaw was available in a short kit and it required a bit of time and modeling skill to assemble properly. The Outlaw features a progressive airfoil that transitions between the root and tip rib and also has anhedral built in. Noted aerodynamicist Robert Vess assisted Jerry with the design and this unique airfoil and planform are part of what makes the Outlaw perform as it does. It also made the Outlaw difficult to build correctly for most modelers. Extreme Flight engineers spent many hours perfecting the construction and assembly of this aircraft and tested many prototypes to make sure the Outlaw ARF lived up to Jerry’s expectations, while making it easy for the average modeler to assemble. For most modelers the Outlaw ARF can be assembled and ready for flight in a couple of evenings. We highly recommend that you stay within the recommended engine range of .25-.36 2 stroke. This will help keep the Outlaw close to the recommended weight range and ensure that it performs as Jerry intended. Jerry usually employs a mousse can muffler in conjunction with a Webra .36 or O.S. .32 for his show planes. Either of these engines will provide plenty of power for the full range of maneuvers that the Outlaw is capable of. We also recommend use of 70+ oz. inch servos for the flight controls. The control surfaces on the Outlaw are quite large and require some servo power to prevent flutter at high speed and to maintain the deflection required for the insane maneuvers that it is capable of. We have had great success with the Hitec HS-475 and its digital equivalent, the HS-5475, both running on 6 volts. These servos provide plenty of power and speed to keep up with the Outlaw. We typically use a mini servo for the throttle such as the Hitec HS-225.

The Outlaw is a very unique aircraft and we are honored to have worked with Jerry to bring it to market. The only thing more fun than flying an Outlaw is flying several of them together with your buddies! Thanks again for your purchase, now let’s get on with the assembly and get this thing in the air!

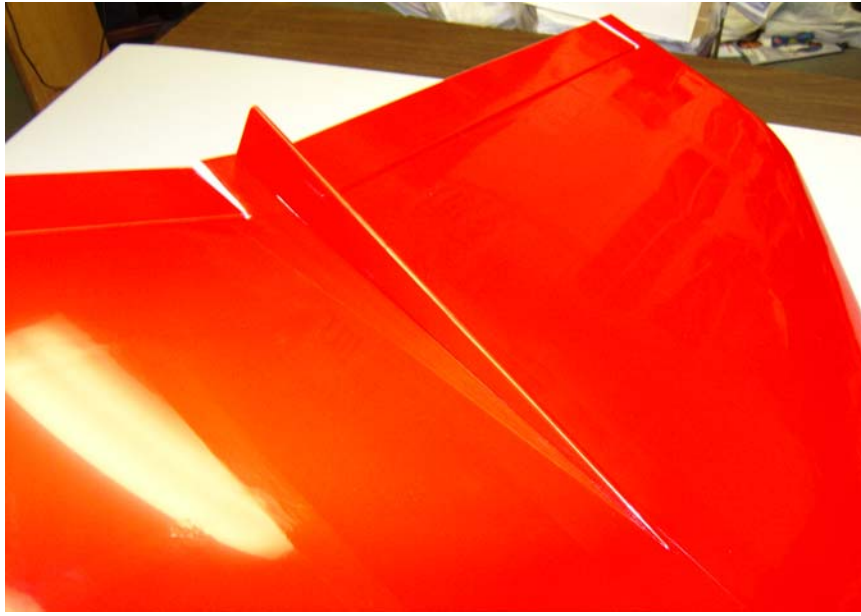
## **Tips for Success-Please read before beginning assembly!!!**

1. Read the instruction manual thoroughly before starting assembly.
2. We are very pleased with the level of craftsmanship exhibited by the workers in our factory. However, these are mass produced models. As with any ARF, take a few minutes to go over the model and add CA to high stress areas such as the firewall, servo mounts or any joints that appear to need more glue.
3. Take a few minutes and go over the covering with a hot iron. Make sure all edges are sealed and pay special attention to thin stripes.
4. **Decals-** clean your airplane with glass cleaner and a paper towel before starting to apply the decals. Mist the area where the decal will be applied with glass cleaner or water mixed with a little bit of soap. Use scissors to remove the decal from the sheet. For best results cut as close to the edges of the decal as possible. Position the decal in place and use a credit card or rubber squeegee to push the excess liquid from under the decal and allow to dry. You may need to secure the edges of the decal with masking tape to prevent them from rolling up until the solution has dried and evaporated.

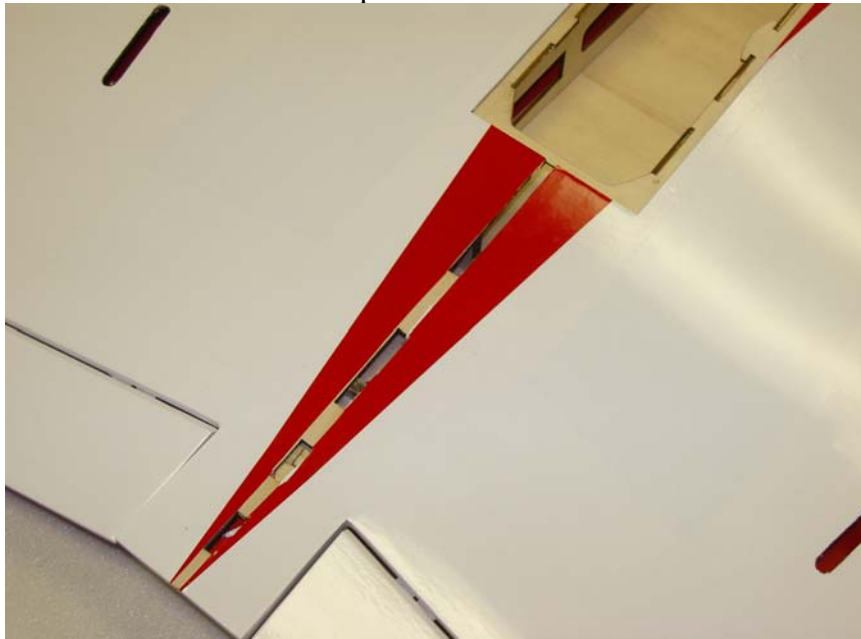
## **Assembly**

1. First let's install the lower vertical fin. It's much easier if this is installed before gluing on the upper vertical fin and rudder. Place the fin in position and trace around it with a fine tipped felt marker. Remove the covering so that there is a wood-to wood bond between the wing and fin. Glue the lower fin in place with 30 minute epoxy, making sure it is aligned properly. You may wish to find the center of the firewall and scribe a line from this mark to the center of the rear of the wing to insure proper alignment.

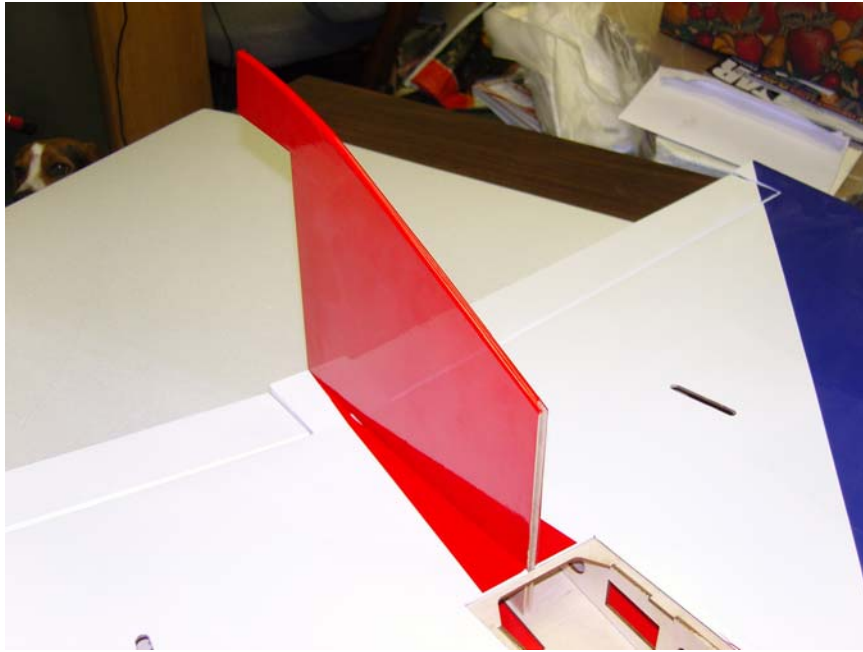




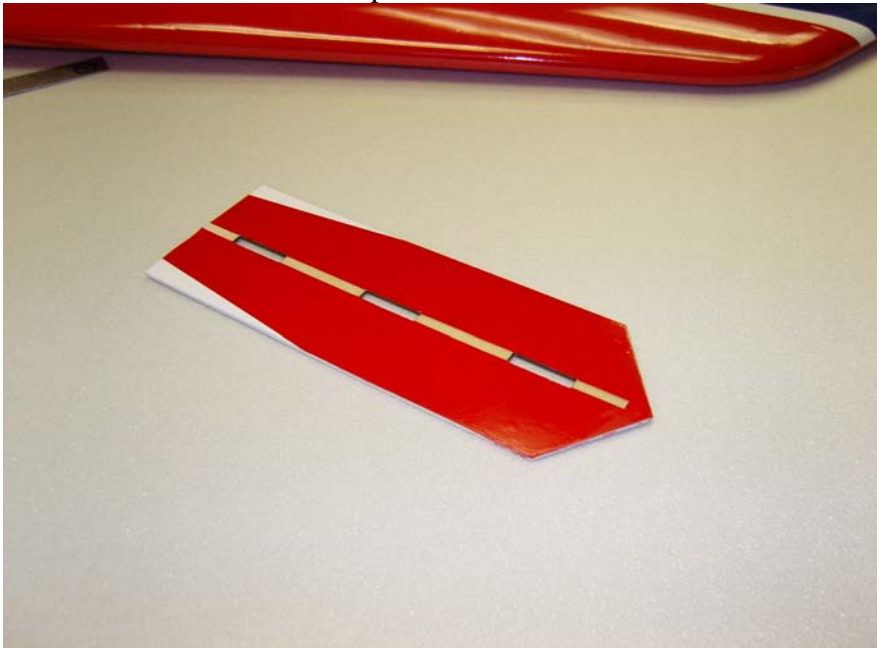
2. Once dry flip the wing over and we'll install the top vertical fin. Use a metal straight edge and sharp hobby knife to remove the covering where the vertical fin will mount as shown in the picture.



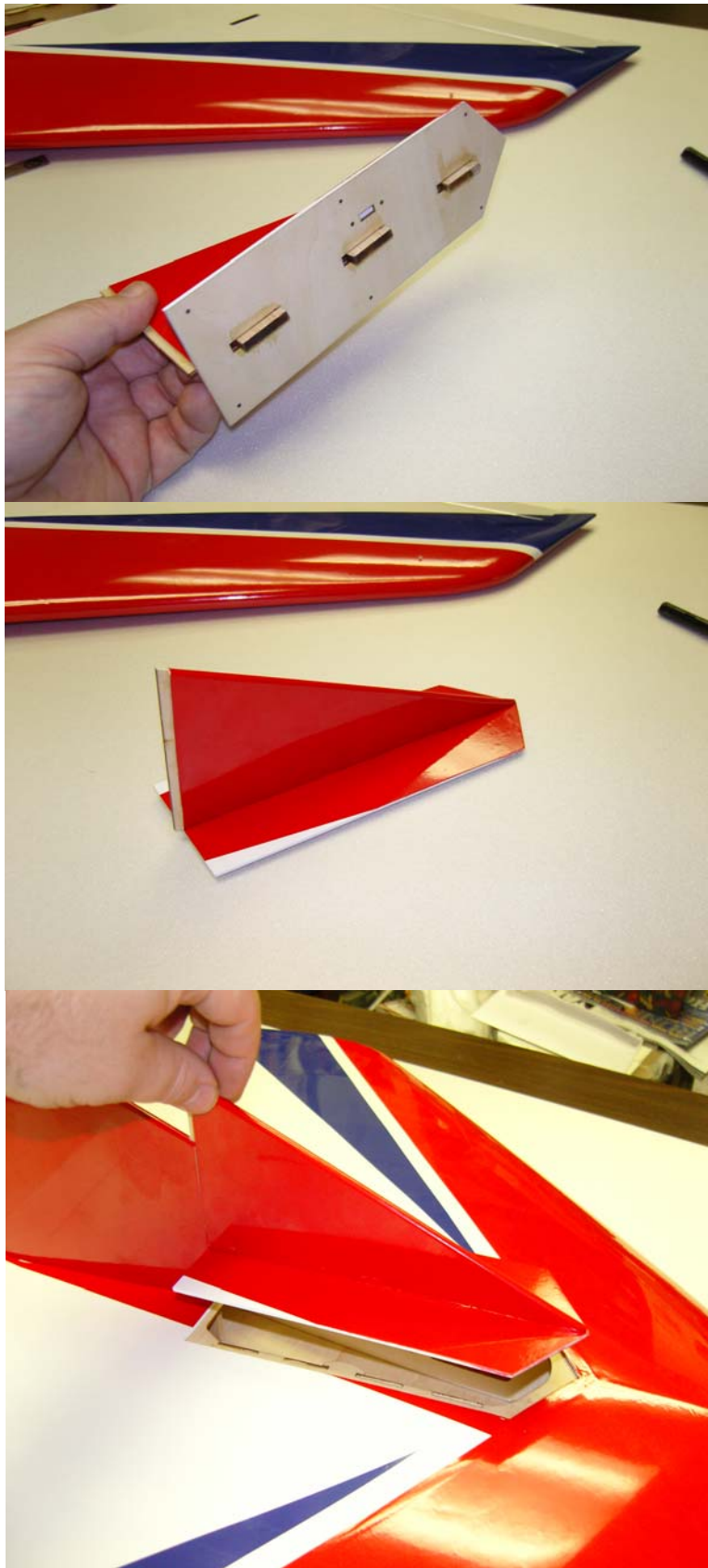
3. The vertical fin has a series of tabs and notches to add rigidity and allow for easy alignment of the vertical fin. Trial fit the fin in place to insure proper alignment. Once satisfied glue the fin in place with 30 minute epoxy. Check from several angles to make sure the vertical fin is properly aligned and square to the wing.



4. Next let's assemble the forward portion of the vertical fin and top hatch. Use a sharp hobby knife and metal straight edge to remove the covering from the top of the hatch where the forward portion of the vertical fin will mount as shown.



5. Glue the forward portion of the vertical fin to the hatch with 30 minute epoxy, making sure the fin is perpendicular to the top of the hatch. Trial fit before gluing and it is also a good idea to test fit the fin/hatch to the aircraft to be sure the tongue and groove portion is properly aligned with the fixed portion of the vertical fin.

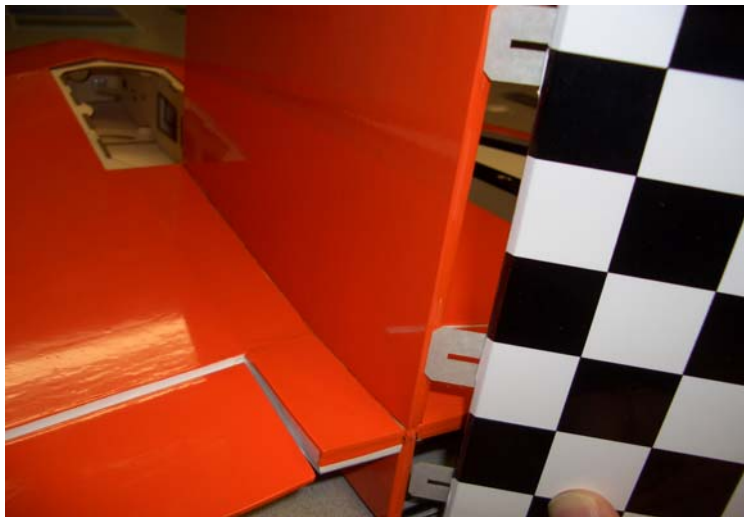




6. Slide the elevons into position and onto the hinges and secure with thin CA. Make sure to center the hinges in their slot before gluing, and leave enough of a gap to ensure maximum deflection. Once dry seal the hinge gap with a strip of covering or Blendederm tape.



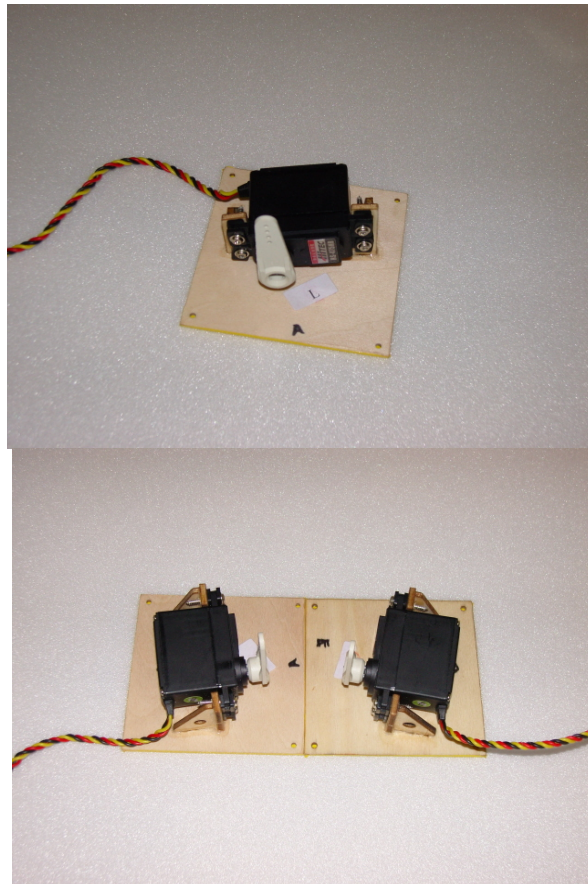
7. Slide the rudder into position on the hinges and secure with thin CA, again leaving enough gap to allow for maximum deflection. Make sure to install the bottom hinge that glues into the lower vertical fin. Seal this hinge line as you did for the elevons.



8. Use a sharp hobby knife to remove the covering from the servo hatch openings, servo arm slots in wing top and rudder servo location in the bottom of the aircraft. Please don't let this photo confuse you as it shows the lower vertical fin not yet glued in place.

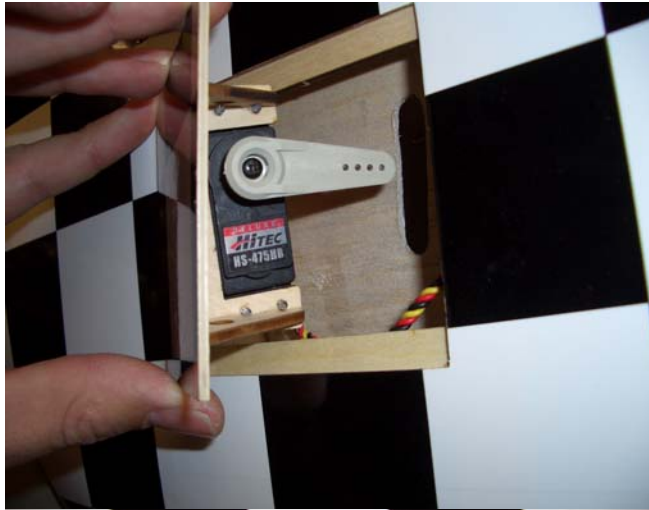


9. Electronically center your servos and place the servo arms on the output shaft and secure with the supplied screws. We highly recommend the use of the Dubro Super Strength servo arms for best alignment with the opening in the top of the wing. Use the manufacturer supplied hardware to mount your servos to the servo hatches. Pay close attention here to the pictures to make sure you mount the servo properly or it will not fit into the wing. The output shaft is oriented toward the rear of the plane.





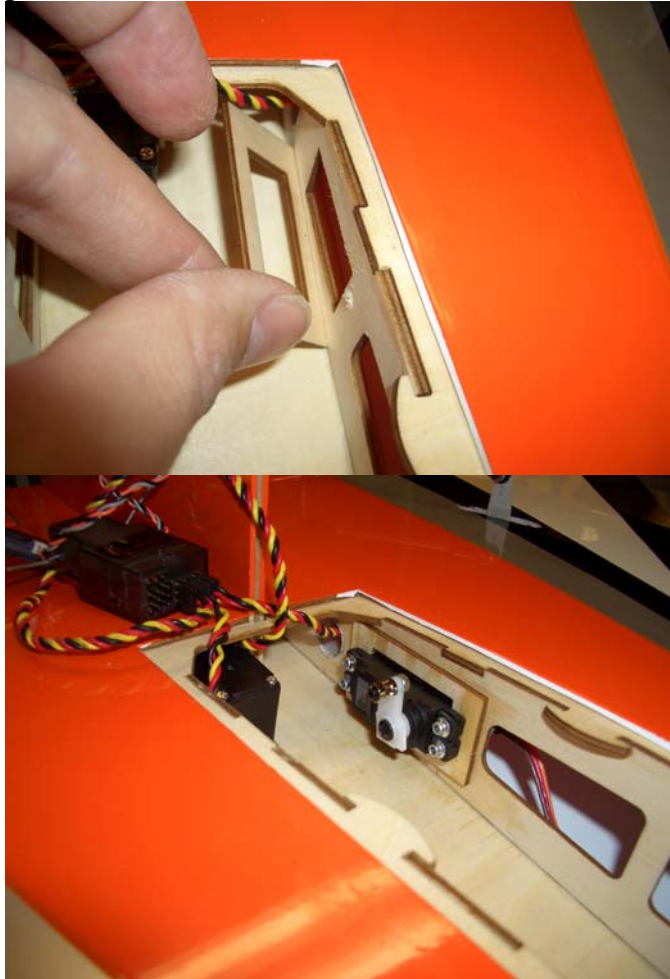
10. Place the servo hatch into position, being sure to route the servo wire into the radio compartment through the fiberglass tube that is pre-installed in the wing. Secure the hatch with the provided screws, one at each corner. You may find that you need to enlarge the width of the servo arm slot in the top of the wing slightly to accommodate different makes of servo. This is easily done with a rotary tool and 1/4" sanding drum attachment. Again the Dubro Super Strength servo arms work best here.



11. Use the manufacturer supplied hardware to mount the rudder servo in the bottom of the wing as shown with the output shaft toward the rear of the plane.



12. We recommend the use of a mini servo for throttle actuation. There is a pre-cut opening on the left interior rib for mounting the throttle servo. This opening is sized for a standard servo. We also supply a plywood mount for a mini servo (Hitec 225, etc.) that is to be glued into place if a mini servo is used. You may find it easier to mount the servo in the plywood mount before gluing it into position.



13. Now let's install the control surface linkages. Locate the 3 sets of triangle shaped control horns and bases, pushrods, ball links, clevises and mounting screws.



14. Use a straight edge aligned with the protruding servo arm to determine location for the elevon control horns to be mounted. Place the triangle shaped horn in place and drill through the control surface at the location of the 3 holes. Use the provided screws to secure the control horn to the surface and thread them into the base plate on the bottom of the surface. Make sure to position the horn so that the pivot point of the linkage is directly over the hinge line.



15. Thread a clevis onto one end of the pushrod and a ball link onto the other end. Secure the clevis to the control horn with the provided screw and secure the ball link to the servo arm with the 3mm bolt and nut. The distance from the hinge line to the pivot point should be the same as the distance from the servo output shaft to the location of the ball link on the servo arm for best mechanical set-up. Screw the connector down on the threaded horn to the proper position.

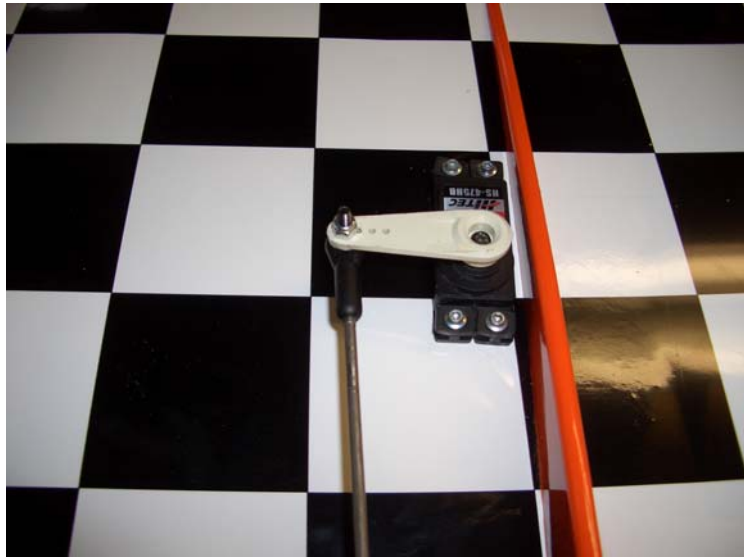




16. The rudder linkage assembles and is installed the same way. Screw in the control horn connector so that the linkage does not interfere with the movement of the elevons. Cut off the bolt that secures the rudder ball link flush with the top of the nut.







16. Mix up some epoxy and thin it with denatured alcohol. Brush this mixture onto the balsa where the fuel tank will mount just behind the firewall. Make sure to coat the rear of the firewall as well as the entire front of the firewall and any areas that are subject to being exposed to nitro fuel.

17. Assemble the fuel tank and install just behind the firewall. You will want to use some closed cell foam to secure the tank and keep it from contacting the rear of the firewall.

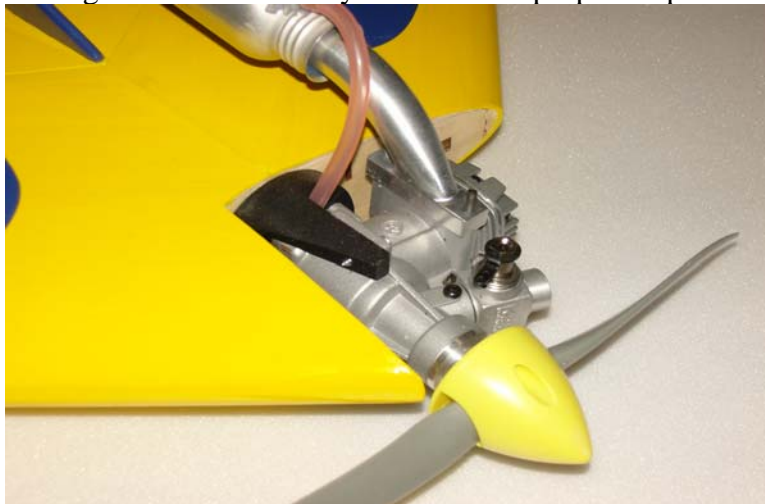


18. Determine the location for your throttle linkage and the location where the linkage should exit the firewall. Drill a hole at this location and glue the supplied plastic pushrod shroud in place as shown.

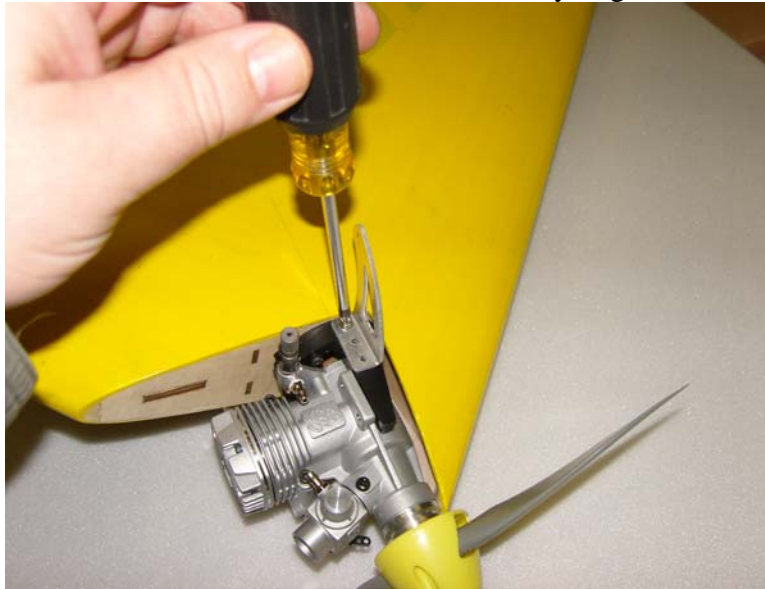




19. Next let's mount the engine. There are blind nuts already installed in the firewall to accept the engine mount mounting bolts. Secure the mount to the firewall with the supplied bolts. Make sure to use a drop of Loctite on these bolts to prevent them from backing out due to vibration. Mount the engine using the supplied machine screws, being sure to leave enough room for the fuel lines to get outside the engine mount. Install your choice of prop and spinner.



20. Use the supplied wire pushrod for your throttle linkage. Attach the linkage to the servo arm with the supplied EZ connector and use the Z-bend at the throttle arm.
21. All that's left is to install your battery, switch and receiver! There is a pre-cut slot in the top of the radio compartment hatch to accept most makes of switches. There is a plastic tube pre-installed in the right rib at the front of the radio compartment that runs through most of the airframe for routing your receiver antenna. Mount your receiver and battery toward the rear of the plane to help achieve proper CG. Make sure to wrap them in closed cell foam for protection against vibration and crash damage. Attach the radio compartment hatch with the supplied short wood screws with large heads.
22. We have supplied an aluminum skid that is to be mounted to the bottom of the nylon engine mount to protect the needle valve if your engine's needle valve protrudes from the bottom of the airframe such as on the O.S. .32. On the Webras and other makes of engine with traditional front mounted needles the carburetor can be rotated so the needle valve is on the top. Mount the skid using 3 screws and then bend the skid so that it is vertically aligned.



23. When installing the prop be sure it is oriented horizontally when the engine is at the top of the compression stroke so that it remains horizontal when the engine stops running. This will keep you from breaking props when landing.

**This completes the assembly process!**

The CG range for the Outlaw is 11.75 inches to 12.25 inches measured forward from the rear edge of the center fixed portion of the trailing edge of the wing.

Control surface throws are as follows:

	<b>Low rate</b>	<b>High rate</b>	<b>Exponential</b>
<b>Elevons:</b>	<b>15 degrees</b>	<b>45+ degrees</b>	<b>30% low rate 80% high rate</b>
<b>Rudder:</b>	<b>20 degrees</b>	<b>45+ degrees</b>	<b>45% low rate 90% high rate</b>

I highly recommend starting on low rates for the first few flights until you get used to the aircraft. It is very responsive on high rates and may scare the heck out of you if you are not prepared! On high rates the roll rate is a blur so make sure you are several mistakes high when trying out high rates for the first time. To launch, have a friend hold the Outlaw with both hands at the wing tips and advance the throttle to wide open. Have your friend push the aircraft forward gently, releasing at about a 25 degree angle. When the fuel is depleted, glide the Outlaw in for a smooth landing, preferably on soft grass. Thanks again for your purchase of the Outlaw ARF! See ya at the flying field!