

48" Aircraft



Build Guide

EXTREME FLIGHT

Please read the following paragraphs before beginning assembly of your aircraft!

THIS IS NOT A TOY! Serious injury, destruction of property, or even death may result from the misuse of this product. Extreme Flight RC is providing you, the consumer with a very high quality model aircraft component kit, from which you, the consumer, will assemble a flying model. It is beyond our control to monitor the finished aircraft you produce. Extreme Flight RC will in no way accept or assume responsibility or liability for damages resulting from the use of this user assembled product. This aircraft should be flown in accordance to the AMA safety code. It is highly recommended that you join the Academy of Model Aeronautics in order to be properly insured, and to operate your model at AMA sanctioned flying fields only. If you are not willing to accept ALL liability for the use of this product, please return it to the place of purchase immediately.

Extreme Flight RC guarantees this kit to be free of defects in materials and workmanship for a period of 30 DAYS from the date of purchase. All warranty claims must be accompanied by the original dated receipt. This warranty is extended to the original purchaser of the aircraft kit only.

Extreme Flight RC in no way warranties its aircraft against flutter. We have put these aircraft through the most grueling flight tests imaginable and have not experienced any control surface flutter. Proper servo selection and linkage set-up is absolutely essential. Inadequate servos or improper linkage set up may result in flutter and possibly the complete destruction of your aircraft. If you are not experienced in this type of linkage set-up or have questions regarding servo choices, please contact us at info@extremeflightrc.com or 770-887-1794. It is your responsibility to ensure the airworthiness of your model.

We recommend that you read this build guide entirely before beginning your assembly, to familiarize yourself with the tools needed and materials used.

Notes on the 48" Series:

- 1.The 48" MXS has an extremely large elevator, so it is designed for a MINI servo for its elevator, the other servos on the MXS and all of the other servos on the 48" Series are MICRO. We recommend the Savox SH-0255MGP micro for all locations except the 48" MXS elevator, for which we recommend the MKS HV-69. The MXS kit does include a spacer if you elect to install a micro servo for the elevator.
- 2.Our standard power recommendation for the 48" Series is now the T-Motor AM480 900KV + T-Motor AM66A ESC. We recommend a 4S 2200-2700mah lipo and T-Motor 13x6.5" prop. The power level is extreme.
- 3.All of our Extreme Flight aircraft have Datasheets available on their respective webpages. On these data-sheets you will find information specific to each aircraft, such as the codes for the covering material, should you need to repair.
- 4.Power systems for this size of aircraft are developing rapidly in the mid 2020's. With the recommended AM480 4S system or any system similarly or more powerful, you will need to be very careful about your servo setup. In general, we want to always use the shortest effective servo arm length at which we can get the throw we want. Our pushrod should connect to the arm in the hole *closest* to the servo, making the shortest possible arm. To get the best throw/arm length setup, turn the *throw* or *travel* setting in your transmitter to its maximum.
- 5.This aircraft is assembled entirely with THIN and MEDIUM CA glue. It is recommended that you purchase new CA for the project, old CA which has been opened for a long is not always effective. If you drip CA onto your aircraft, use CA DEBONDER on a rag to dissolve and clean up the glue.

Covering

Your aircraft has been on a journey around the world since it left our factory. Although the covering material was perfectly smooth when it was boxed up, changes in weather and humidity may have wrinkled the covering material. For certain, wrinkles will appear in the covering once you have unpacked your aircraft and it adjusts to the atmospheric conditions in your region. Learning to remove wrinkles from covering is a necessary skill to maintain your wood aircraft.

Your Extreme-Flight produced aircraft is covered in Ultracote covering material (US market name), also called Oracover in global markets. If you need replacement covering to repair damage, Ultracote/Oracover is widely available from retail hobby suppliers. Also, each roll of Ultracote/Oracover includes excellent instructions which are also available online. Please refer to them for details about working with and/or repairing your covering.

The basic tools are a covering iron and a hobby heat gun. Start by using the iron at 220F (104C) to seal all of the edges on the covering scheme. This is **CRITICAL** on the leading edges of wings and stabilizers. Then use the iron at 300F (149C) or a heat gun to shrink out any wrinkles in the covering. Remove the plastic canopy from the aircraft when using a heat gun to protect it from heat damage. **GO SLOWLY AND CAREFULLY** to avoid over-shrinking or burning the covering. This is a skill which takes a bit of practice. There are many tutorial videos online demonstrating shrinking wrinkles from Ultracote.

Periodically repeat the sealing and shrinking process to keep your aircraft in good condition.



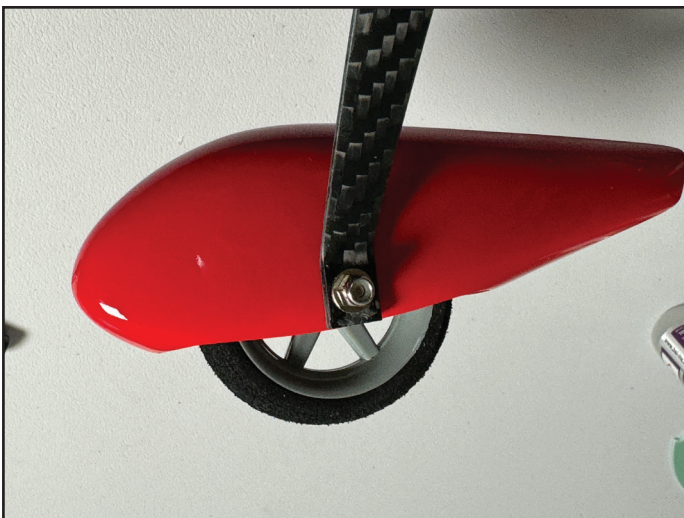
If you need additional covering material to repair your aircraft, check the aircraft datasheet available on the airplane page on our website for color codes.

1

Locate the carbon landing gear and note that when installed correctly, the gear sweeps slightly forward.

install the wheels onto the axles, and locate the aluminum wheel collars which retain the wheels. The are held onto the axles with set screws. Remove the set screws and apply a small drop of BLUE loctite thread-locking liquid to the screws. Install the collars and tighten the set screws.

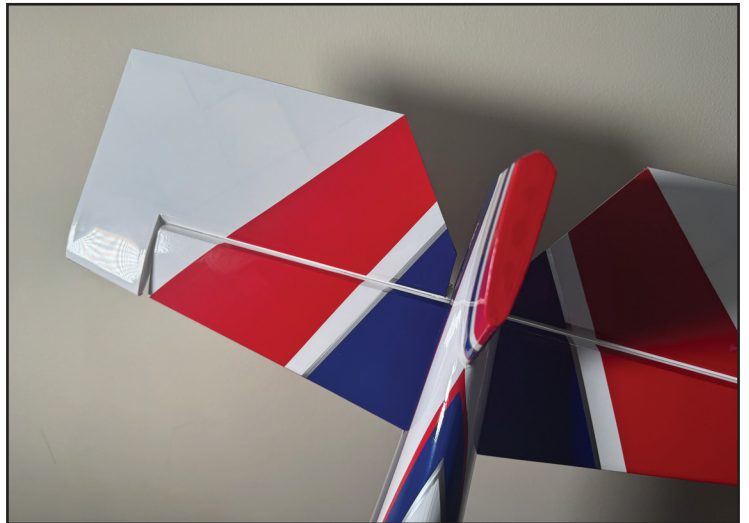
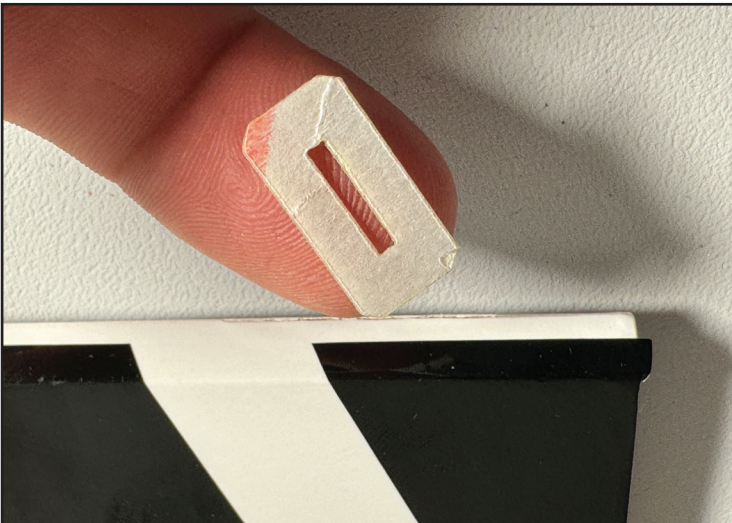
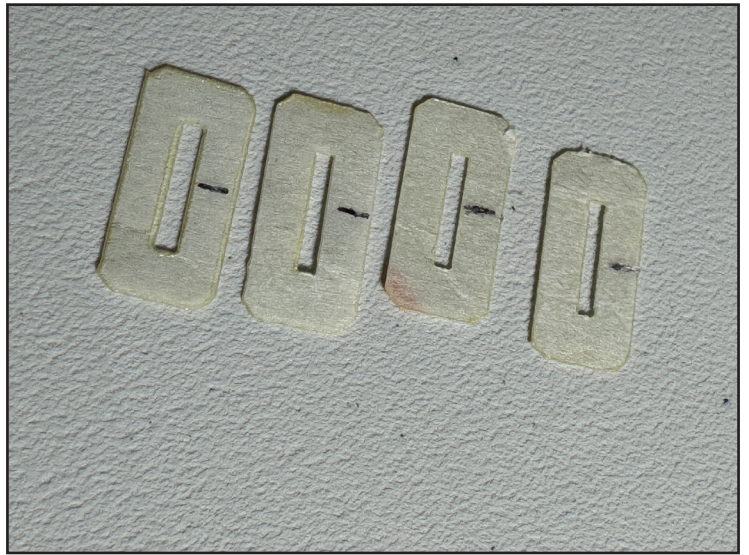
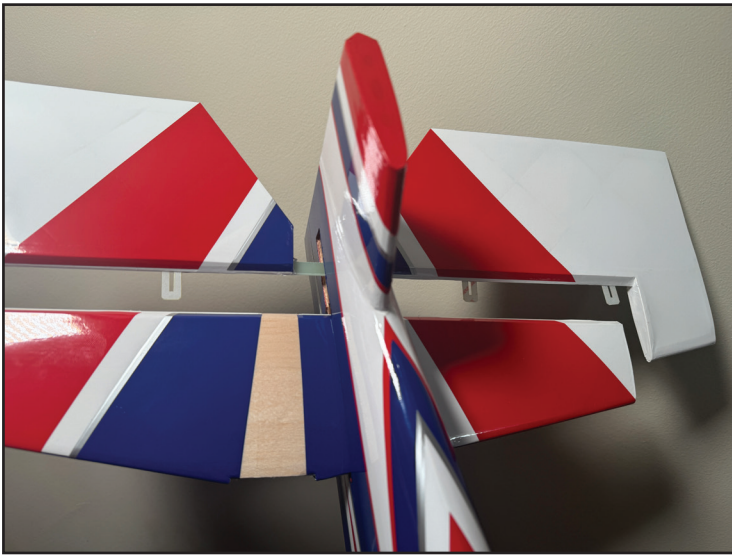
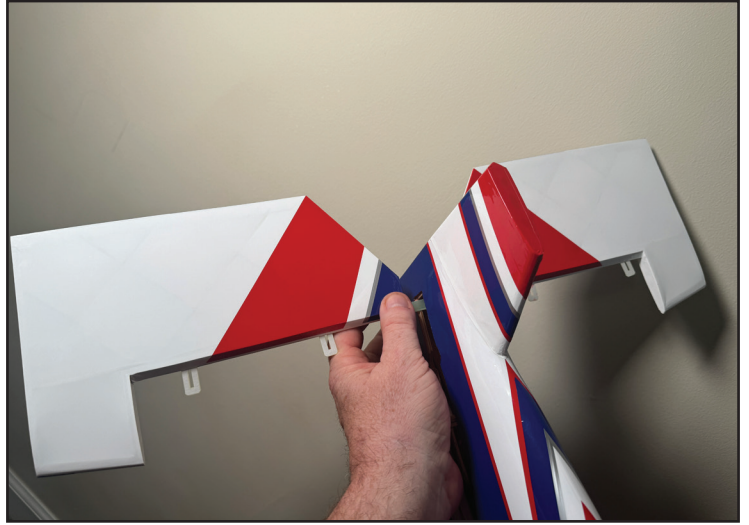
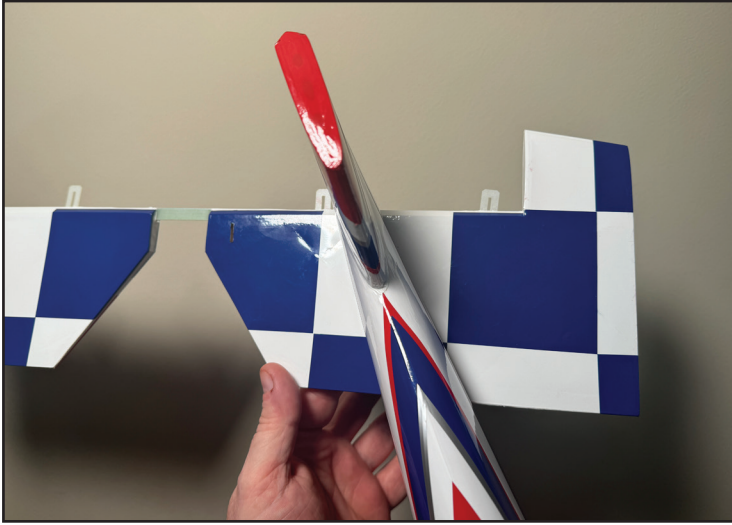
Install the axles onto the gear, capturing the fiberglass wheel pants as shown, and install the washers and nylon-locking nuts as shown. Finally, install the gear assembly onto the bottom of the fuselage with 3mm bolts as shown, put a drop of BLUE Loctite onto each bolt.



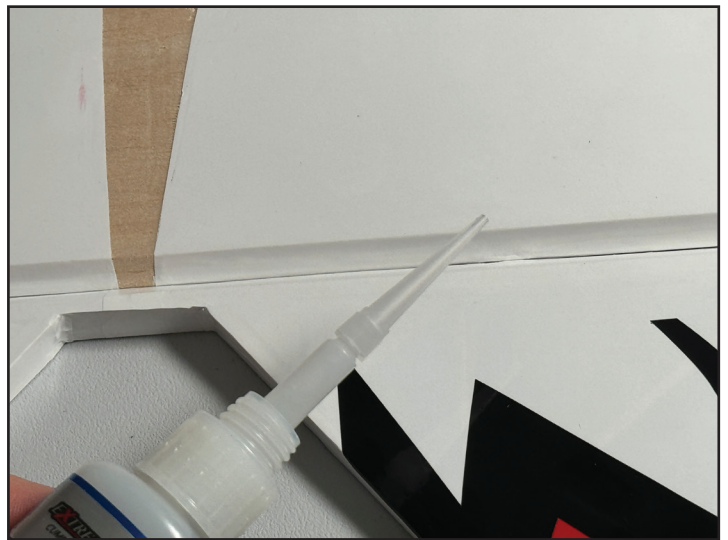
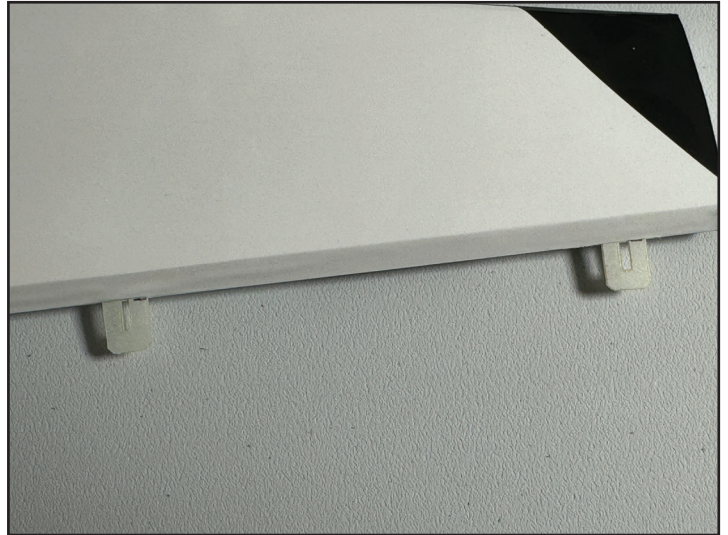
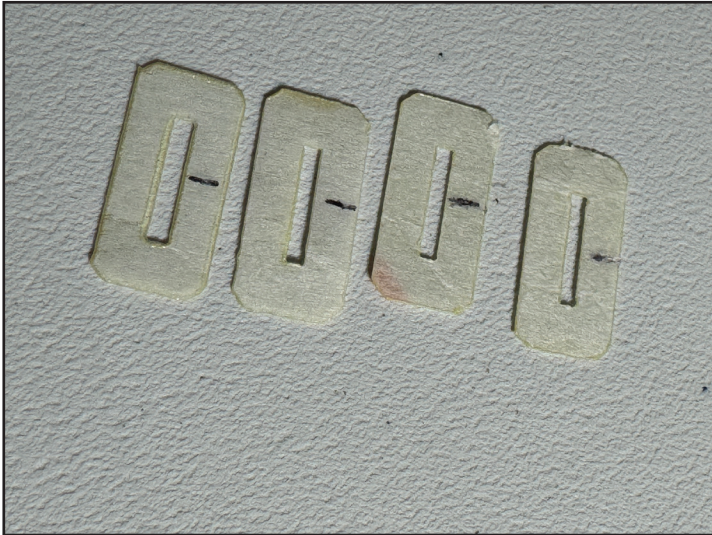
2.

As of the writing of this manual, all of the 48" series of aircraft are shipped with pre-hinged and gap-sealed ailerons. You will hinge the elevator and rudder as part of your build. NOTE: we will continue to develop our kits and so do not be surprised if we do additional pre-fabrication in future production runs.

The MXS is different from the Extra and Edge. On the MXS, insert the elevator into the slot in the fuselage, upside-down and backwards as shown. Then flip the elevator right-side-up. Insert the stab and center it in the fuselage. Remove the hinges from their slots and draw a center line with pencil on the hinges as shown. Then re-insert the hinges into the stab, using the pencil mark to set depth, and slide the elevator onto the hinges. The gap between the elevator and stab should be small, approx 1mm or less. Flex the elevator to make sure of free movement. Add a few drops of thin CA to each hinge.



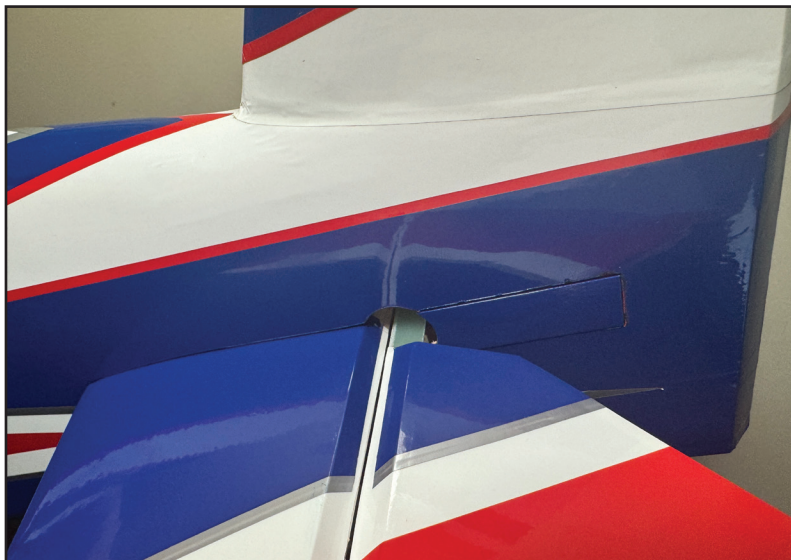
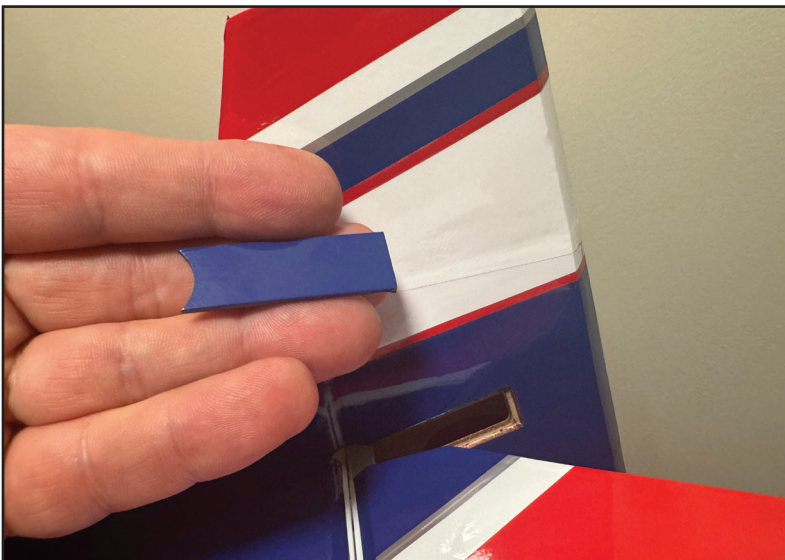
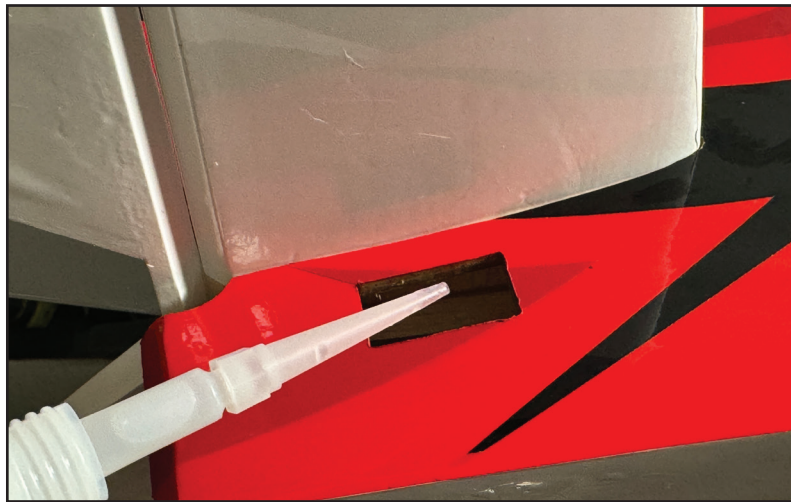
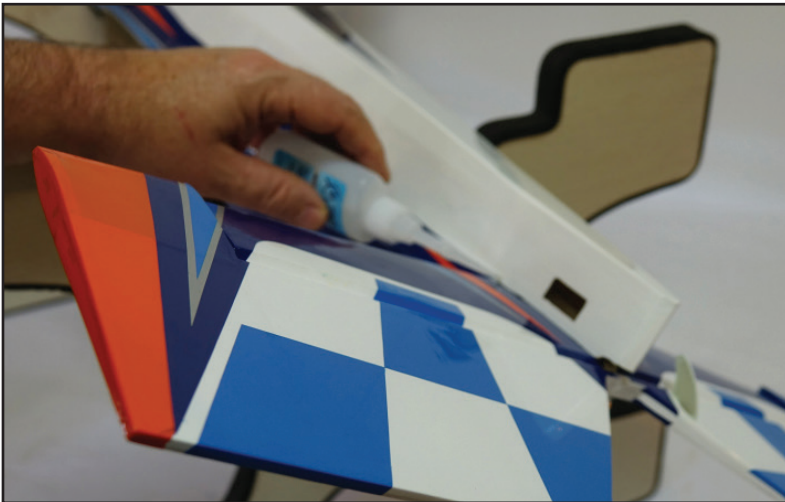
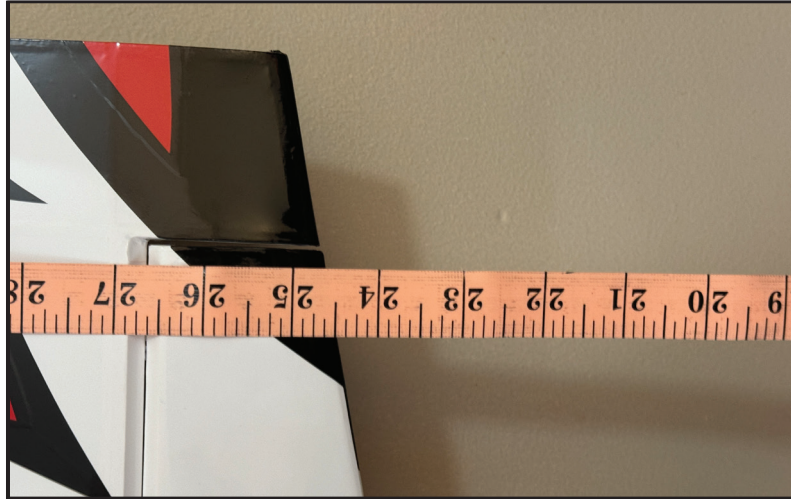
For the Extra and Edge, we begin by hinging the elevator onto the horizontal stabilizer. Remove the hinges and use a pencil to mark a centerline on them. Now, install the hinges into the stabilizer, centering the mark. Then slide the elevator onto the hinges. The gap between the stab and elevator should be minimal, only about 1mm. Flex the elevator up and down make sure it swings freely, make sure the elevator is centered side-to-side, and then add a few drops of thin CA directly onto each of the hinges. Allow to dry. Insert the Stab and Elevator fully into the fuselage.



3.

For all three aircraft: Insert the carbon wing tube. Make sure the stab is close to level with the wing tube. A slight error here will not affect flight performance. If you need to shim the stab a little, use a strip of typing paper between the stab and the fuselage on the bottom side. When we glue the stab in place with thin CA, the glue will penetrate the paper very well. Make sure the stab is also relatively straight when looking from the top of the fuselage. You can use a tape measure or yardstick to check the distance between the elevator hinge and wing tube on both sides. When satisfied, use thin CA to glue the stab into the fuselage. If you have any gaps which need filling, use medium CA. If you need to clean up any spilled CA, use CA debonder on a paper towel.

For MXS only: Locate the two gap filler panels, and glue into the fuselage behind the elevator as shown.

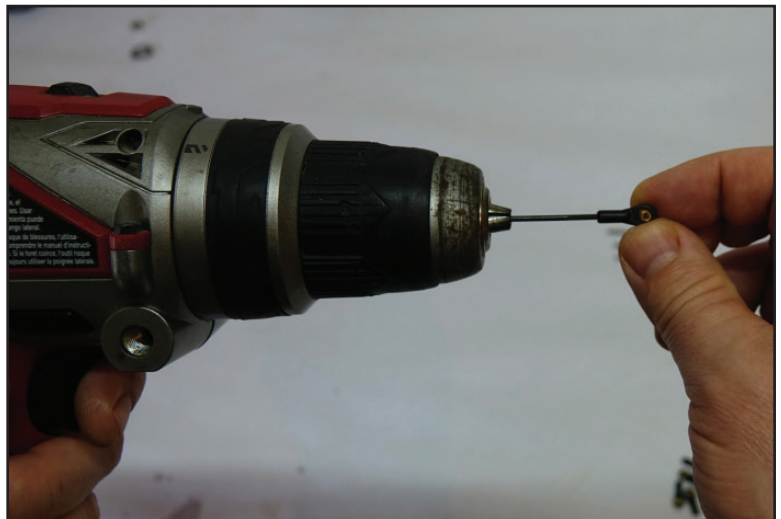
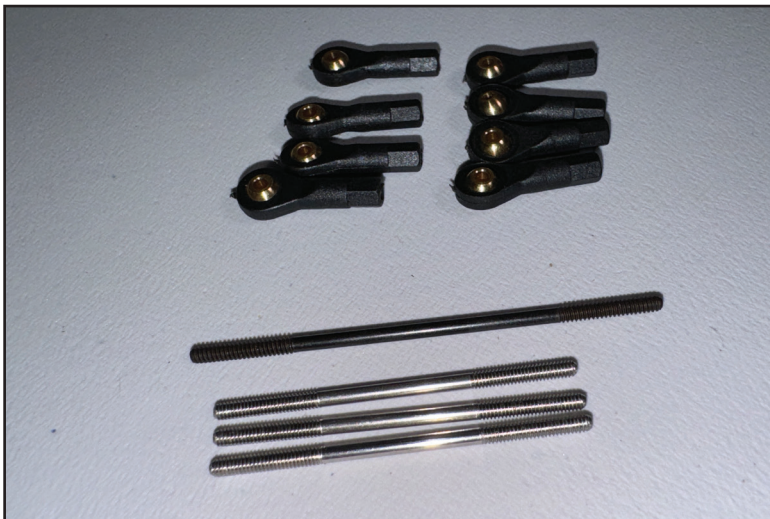
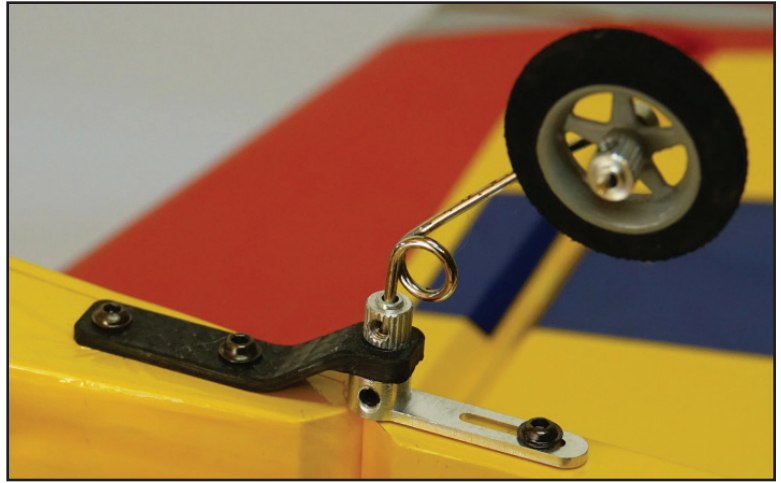


4.

Using the same hinging technique, install the rudder onto the fin and fuselage.

Locate the tailwheel. Install it onto the fuselage as shown with two wood screws. Install another wood screw into the rudder through the slot in the aluminum tiller as shown, but do not tighten this screw fully, it needs to stay slightly loose so it can slide in the slot when the rudder moves. Check for free rudder action.

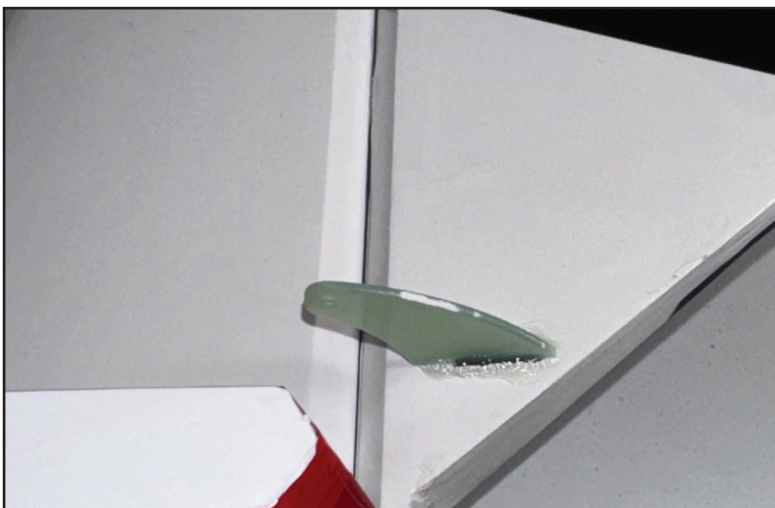
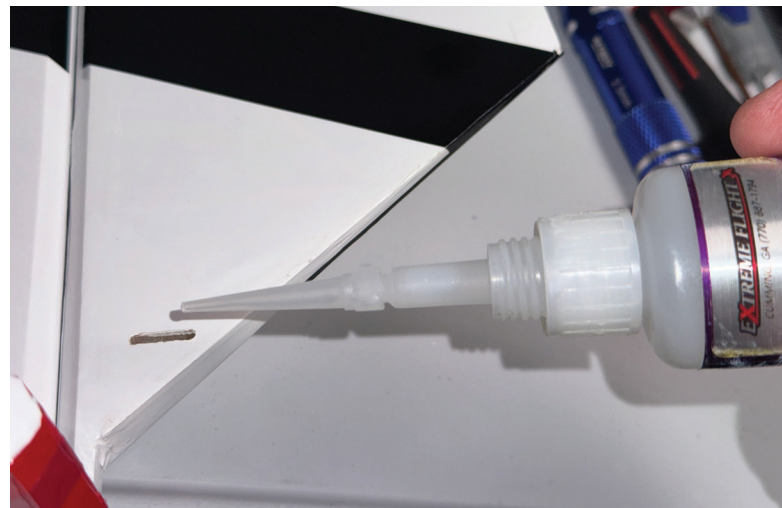
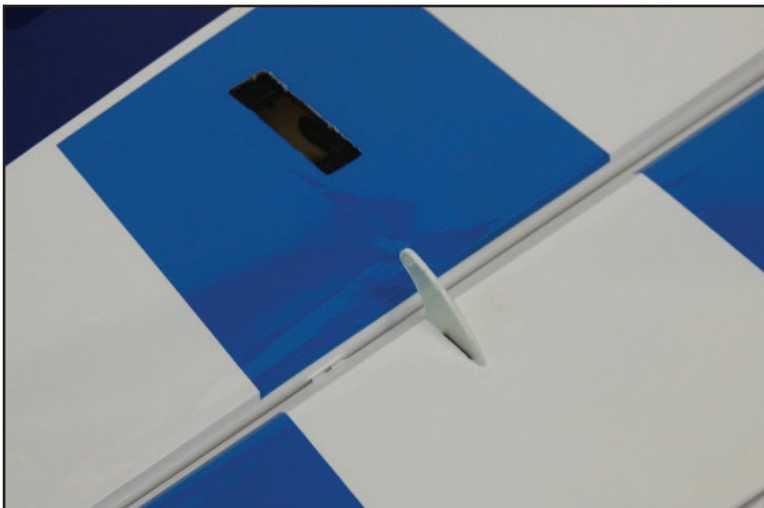
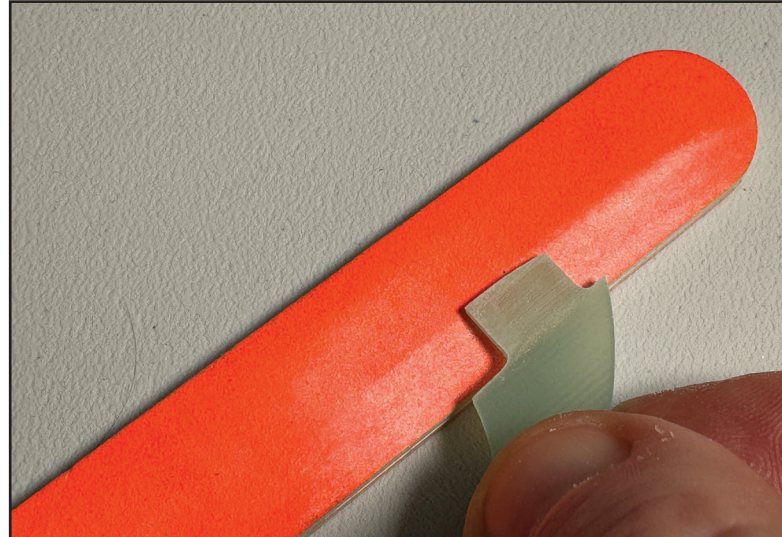
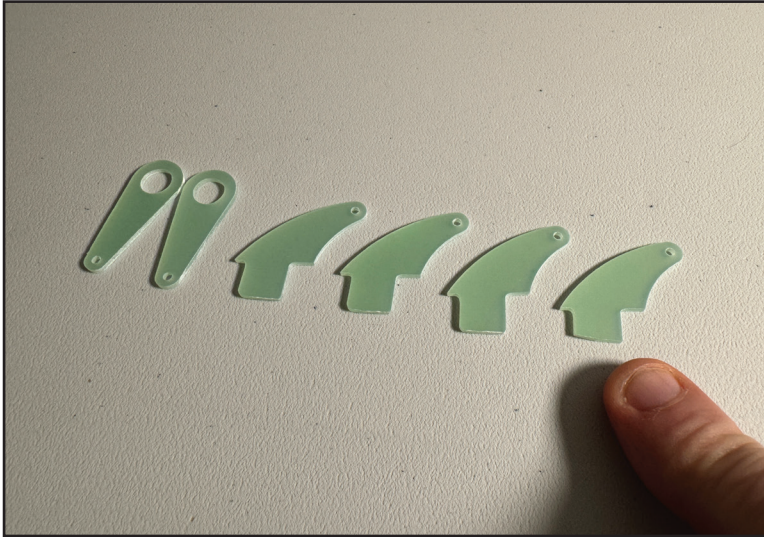
Locate the pushrods and ball link ends. We like to use a battery powered drill to easily screw the links onto the pushrods. The pushrods are threaded right-hand on both sides. Note that you have two identical length short pushrods, these are for the ailerons. The remaining two are for the elevator and rudder.



5.

Locate the composite parts, the control horns and the two servo arms. Note that one of the horns has its tab end ground shorter than the other three. This shorter horn is for the elevator, because the elevator is thin. Use sandpaper or an emery board to scuff the part of the horn which fits into the control surface as shown. This provides a good gluing surface.

Locate the slots in each control surface. Test fit the horns without glue, if necessary clean out the slot with a hobby knife. They should fit snugly. Remove the horns. Put several drops of medium CA glue into the slot, then insert the horn fully, then apply a few drops of thin CA glue where the horn enters the slot. Allow to dry.



6.

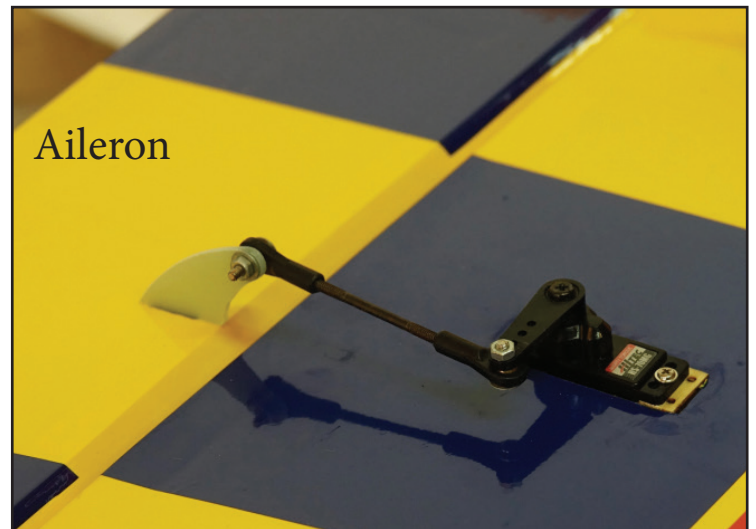
Install the servo wire extensions onto your servos. Use either connector locks or tape to ensure that the extensions will not disconnect in flight. Install the servos for each surface.

NOTE: The elevator servo opening on the MXS is a MINI size servo. All of the other servos on the MXS, and all of the servos on the Edge and Extra, and MICRO size servos. This is due to the very large elevator of the MXS. As Micro servo technology improves, some micro servos are being developed which are sufficient for the MXS elevator. Your MXS kit includes a wood spacer to assist in making a custom-install of the a micro servo for the elevator if you choose.

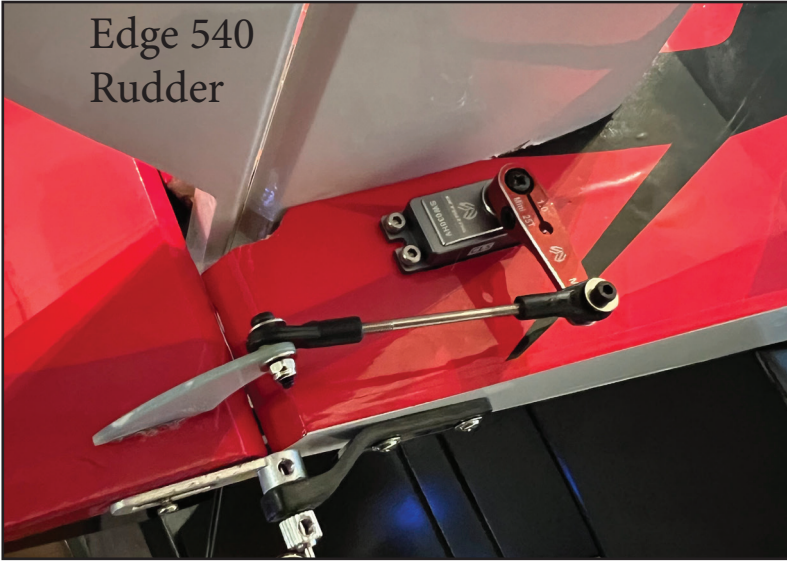
NOTE: Included in your kit are two composite servo arms. As servo manufacturers develop new products, more micro servos are available with high quality aluminum arms. We recommend metal arms when possible. If your servos have no compatible metal arms, the included composite arms may be installed, see photos.

NOTE: For the aileron linkages we typically install the ball link to the bottom of the servo arm as shown for better geometry. Depending on your arm, this may also benefit the elevator and/or rudder linkages.

Install the pushrods as shown, the latest hardware consists of black hex bolts, washers, and self-locking “nylock” nuts.



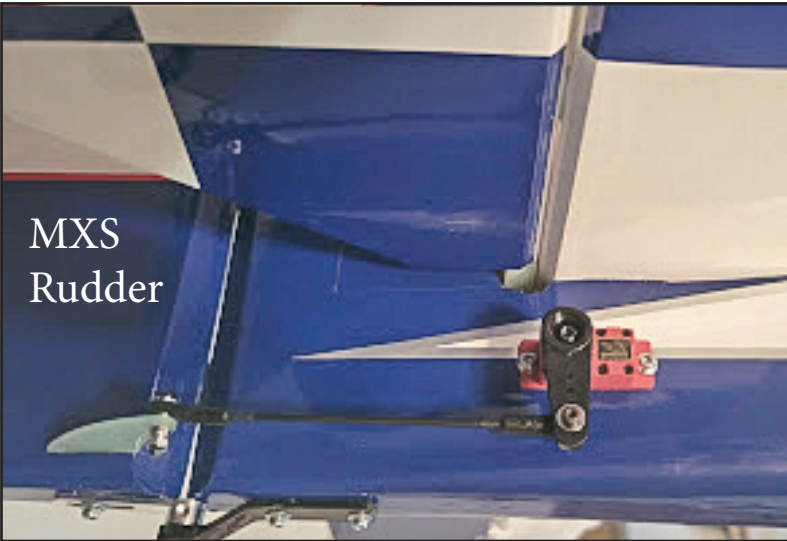
Edge 540
Rudder



Edge 540
Elevator



MXS
Rudder



MXS
Elevator



MXS
Elevator micro servo
mounting spacer



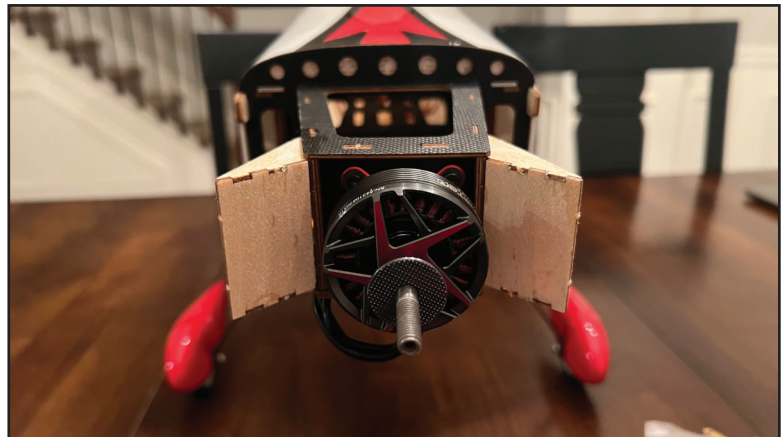
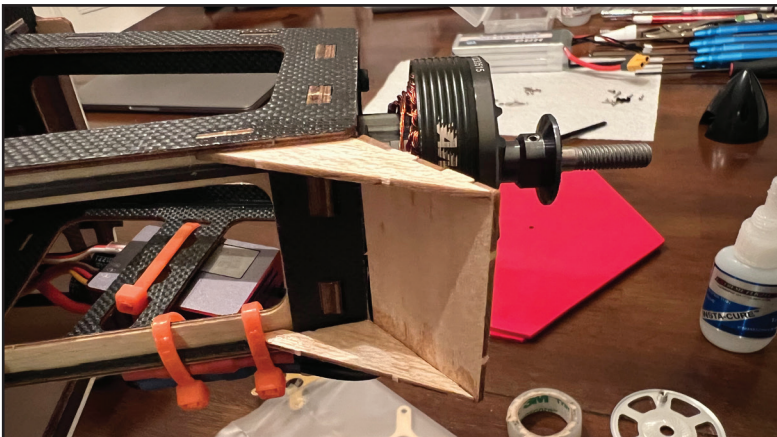
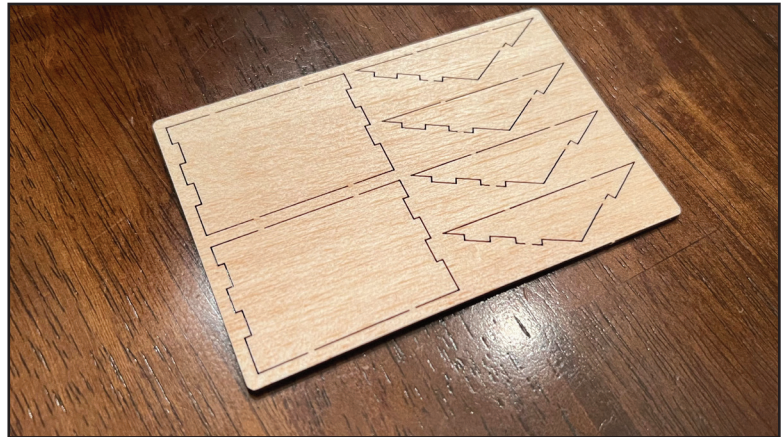
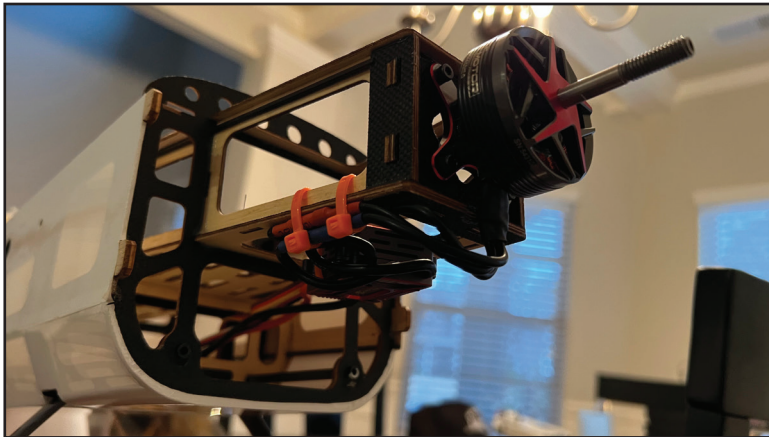
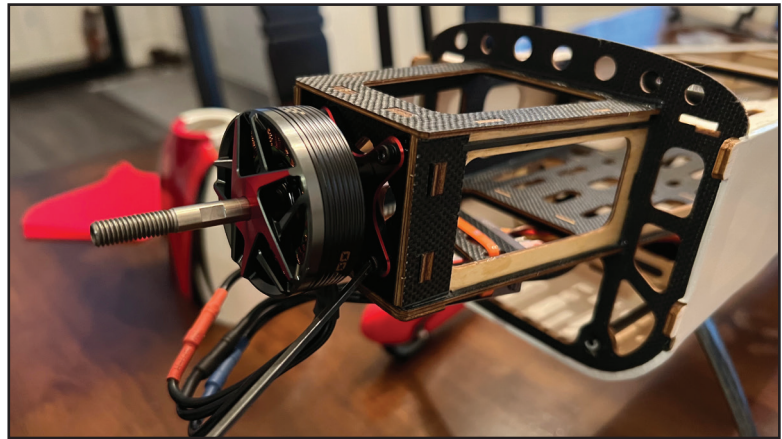
7.

This step details the installation of the T-Motor AM480 power system, but the installation of all brushless outrunner motors will be very similar. For the AM480, use the smaller of the X-mount brackets. The firewall/motor mount on the front of the airplane has 4 metal blind nuts installed for mounting common motors. Attach the motor with included 3mm bolts and use a drop of BLUE Loctite on each.

Note that the firewall/motor mount is pointed 2.5 degrees to the RIGHT. This is by design. The effect of the spinning prop is to push the nose of the aircraft left in high-power/low-air-speed maneuvers. The motor points slightly right to largely cancel this effect and make the airplane easier to fly.

Attach your ESC to the bottom of the motor box using velcro or zip ties. Assemble the balsa cooling deflectors as shown using CA glue.

NOTE: The distance from the firewall/motor mount to the front of the cowl is set to fit common brushless motors. If you need to extend the mount, your kit includes three motor spacing shims.



8.

For quick, easy and accurate mounting of the cowl we recommend the following method: Tear 4 short pieces of masking tape from a roll. Place each piece of tape on the side of the fuselage so that each piece corresponds with one of the 4 cowl mounting tabs. Use a fine tipped marker to mark the location of the hole in the center of each mounting tab. Roll the tape back and slide the cowl into position. Install the included 52mm spinner onto the motor shaft for reference and once satisfied with the cowl position roll the tape back into place and secure the cowl. Use a 1/16" drill bit to drill a hole at the location of the dot on each piece of tape. Remove the tape and secure the cowl with 4 of the included small wood screws with integrated washers.



9

Mount your receiver to the tray behind the wing tube as shown.

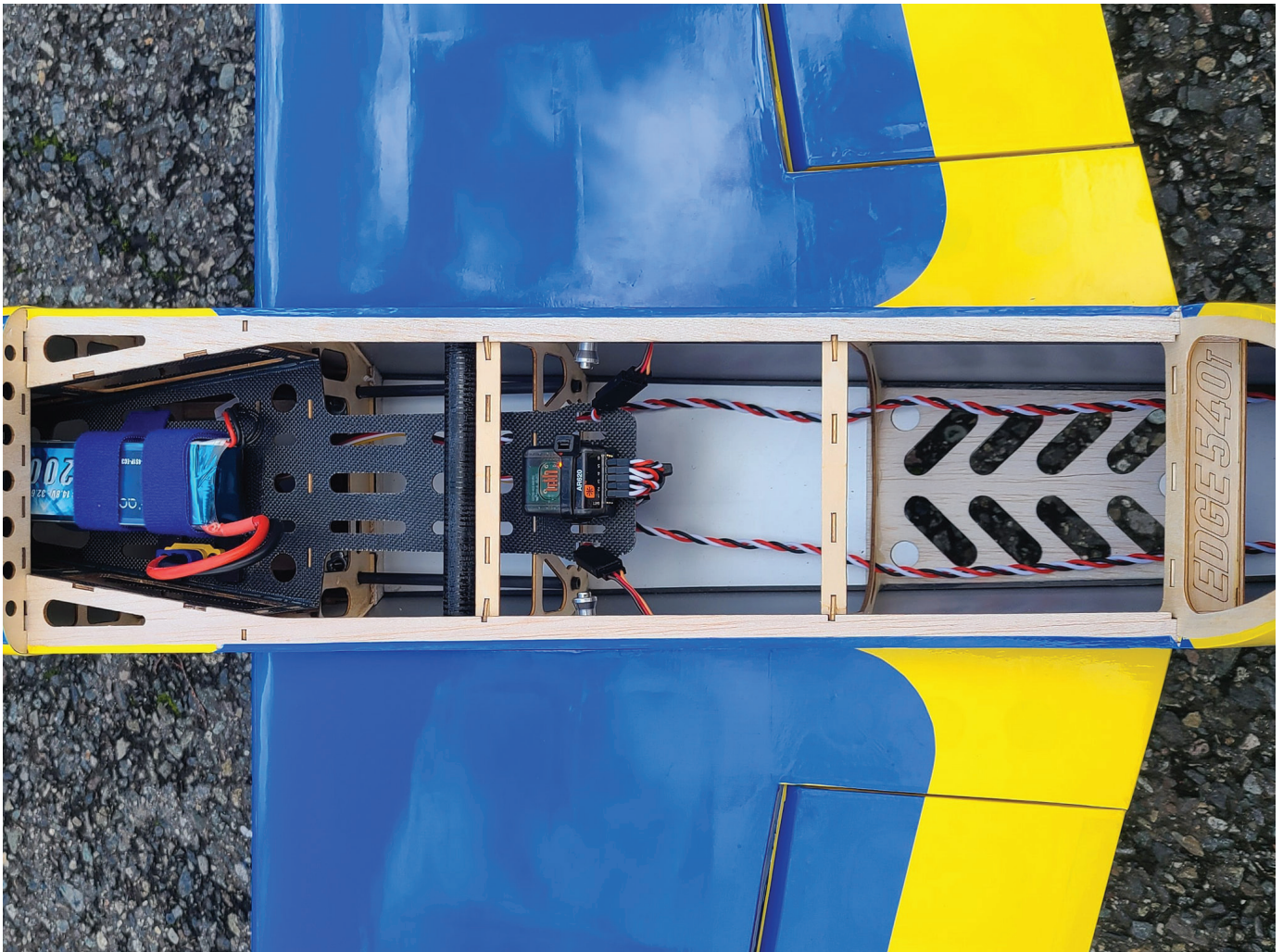
Mount your lipo battery using the included self-adhesive velcro between the battery and the tray, and use one or (preferably) two velcro straps that go around the battery and the tray. The forces exerted during hardcore aerobatics trying to pull your battery off of the tray are extreme. Make sure it is well attached.

NOTE: when powering your aircraft, observe these important safety rules:

- 1.Remove the prop anytime you are working on your aircraft and the lipo will be plugged in.
- 2.Remove the prop before first powering your system in case the throttle channel is reversed or incorrect.
- 3.Remove the prop before powering your aircraft for any purpose except flight.

Special note about gyro stabilization systems:

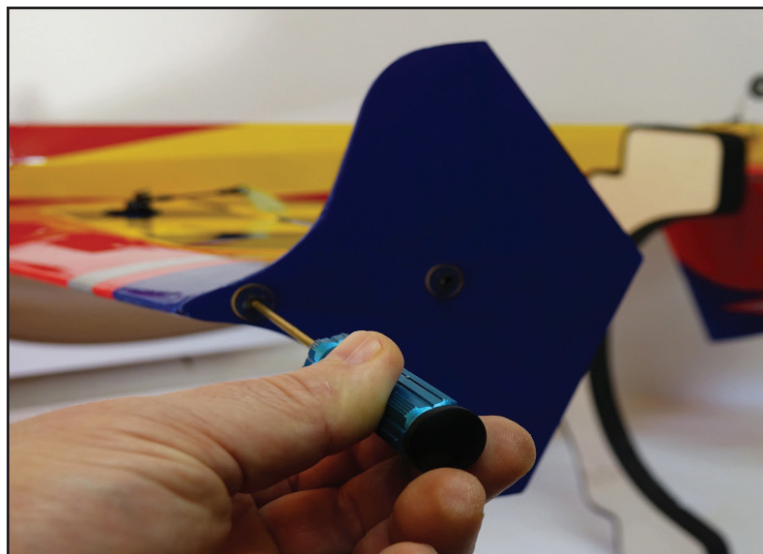
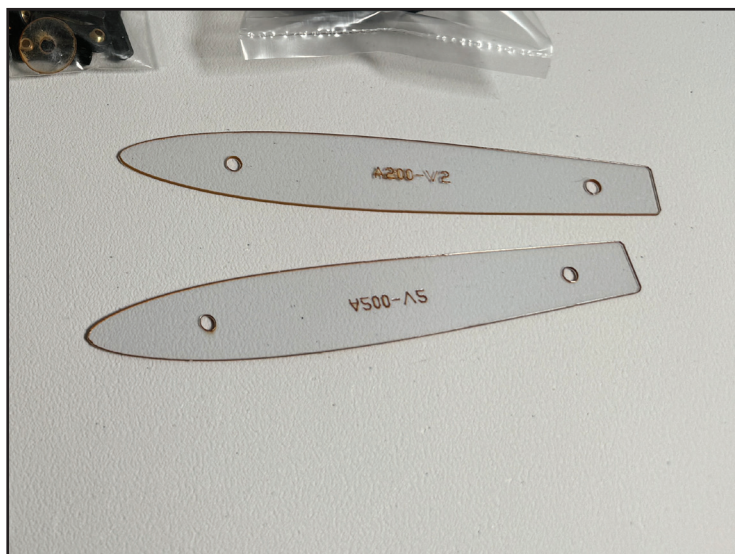
48" aircraft are a popular choice to install stabilization systems into. The first note is that they are not needed, these aircraft are very stable and easy to fly, particularly on low rates. Secondly, it is imperative that, in order to successfully tune your aircraft, you fly and trim the airplane without the gyro installed. Difficulty in trimming is an extremely common complaint from gyro users, and the best way to prevent this is to trim without the gyro installed first, then install the gyro after the aircraft is fully trimmed.



10.

Your kit includes SFG's (Side-Force Generators), flat winglets which attach to the wingtip. The main effect of the SFG's is to make the aircraft more stable in 3D flight. You should definitely try them, all of our pro team pilots prefer the 48" series with the SFG's installed. Use the included clear plastic spacers between the SFG's and the wingtip to prevent the SFG rubbing on the aileron during flight. The SFG's are meant to be removed to allow the wing to be stored between trips to the flying field, so do not loctite these screws.

The MXS kit, in addition to SFG's, includes racing style wing tips. These also affect flight and you should try with and without them. They attach to the same locations as the SFG's and both can be installed at the same time if desired.



11.

Set up your control surfaces with appropriate throws, our recommended settings are below:

NOTE: Remove your prop when doing this step, it is a common mistake to accidentally reverse the throttle channel with disastrous results.

Control settings:

Elevator: Low Rate 8-10 deg. 15-20% expo
3D Rate 45-50 deg. 60-65% expo
XA/Tumbling rate 60+ deg. 65-70% expo

Aileron: Low Rate 15-20 deg. 40-45% expo
High Rate 35-40 deg. 70-75% expo

Rudder: Low Rate 20 deg 40-45% expo
High Rate 45-50 deg. 80-90% expo

If you are using the T-Motor AM480 power system, it is pre-programmed and no adjustments are needed.

Center of gravity:

Your model has a very wide Center of Gravity range. Unlike some types of model aircraft, CG is not merely a point on these 3D aerobatic aircraft, it is a wide range.

At the front of the range, a more nose-heavy airplane will:

Fly in straight lines without much pilot attention.
Be overall less responsive, especially less responsive to elevator.
Tend to keep its nose down on final approach for easy landings.

At the back of the range, a more tail-heavy airplane will:

Tend to need more attention to hold perfectly straight lines.
Be overall more responsive, especially more responsive to elevator.
Tend to need the pilot to hold the nose down on final approach.

On these aircraft, to simplify, to balance at a nose heavy CG, assemble the aircraft except for the canopy hatch. Pick the airplane up by its carbon wing spar tube. It should hang level or slightly nose-down.

If you would rather have a more tail-heavy CG for high performance 3D flight, pick the aircraft up and set the battery so it hangs level:

Edge and MXS - by the fuselage former cross-piece which is approximately 1/2" behind the wing tube.

Extra - by a point approximately 1/2 behind the wing tube.

Your final CG location should be determined after testing at different positions to find your best one.