LEGACY AVIATION

120” Turbo Bushmaster

BY EXTREME FLIGHT

Please take a few moments to read this instruction manual before beginning assembly. We have outlined a fast, clear and easy method to assemble this aircraft and familiarizing yourself with this process will aid in a quick, easy build.

Please read the following paragraph 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 with the AMA safety code. It is highly recommended that you join the Academy of Model Aeronautics 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, Ltd. 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.

Hardware/Supplies/Tools

- **Hardware:**
  - EF Socket Head Screws
  - EF Socket head Servo Screws
  - EF Servo Extension Safety Clip
  - EF Velcro Strap
  - EF Anodized Washer Set
  - EF Fuel Vent
- **Supplies:**
  - Thin CA glue
  - 30min Epoxy
  - Denatured alcohol
  - Blue thread locker
  - Painters tape
  - Clear silicon adhesive
  - Sandpaper/sanding block
- **Tools:**
  - Covering iron
  - Hobby Knife
  - 13mm socket and ratchet
  - 12mm wrench
  - 1.5mm, 2.0mm, 2.5mm, 3.0mm, 4.0mm hex screwdrivers
  - 4.0mm, 5.5mm hex nut driver
  - Forceps, pliers, vice grip
  - Electric drill and drill bits
  - Dremel tool

Recommended Parts

- **Power System for Gas options:**
  - Desert Aircraft DA-70 or Great Power GP-76
  - Blazing Star DA-70/GP-76 standoff
  - MTW 110H Rear Exit Canister Combo for DA-70 or J&A Engineering DA-70 mufflers
  - Falcon 24x9 or 3-blade 22x10 Carbon Fiber gas prop
  - EF Carbon Fiber Spinner
  - FlowMaster 24-34oz Gas Tank
  - FlowMaster Fuel Line
  - EF Anodized Fuel Dot
- **Power System for Electric options:**
  - Xpwr 60cc Electric Motor
  - Castle Creations Phoenix Edge 160 HV ESC
  - Blazing Star XXL Standoff
  - 12s 5000mAh+ battery setup
  - Xoar 24x10/24x12 Beechwood Electric Prop
  - Xoar 24x10/24x13 Carbon Fiber Electric Prop
- **Servos:**
  - 7 high torque metal gear servos for control surfaces are needed
  - Savox SV1280SGP (elevators, ailerons, flaps, rudder) servo- **Qty (7)**
  - Savox SV1254MG Throttle servo- **Qty (1)**
  - Savox SV1250MGP Tailwheel servo- **Qty (1)**
- **Servo Arms:**
  - 2.0in EF Servo Arm (elevators, rudder)- **Qty (3)**
  - 1.5in EF Servo Arm (ailerons, flaps)- **Qty (4)**
  - 1.25in EF Lightweight Arm (tailwheel)- **Qty (1)**
- **Servo Extensions with MPX plug:**
  - Rudder: EF 48-inch 20 AWG servo extension- **Qty (1)**
  - Elevators: EF 36-inch 20 AWG servo extension- **Qty (2)**
  - Tailwheel: EF 36-inch 20 AWG servo extension- **Qty (1)**
  - Throttle: EF 24-inch 20 AWG servo extension- **Qty (1)**
  - Ailerons: EF 18-inch 20 AWG servo extension- **Qty (2)**
  - Wing: 2-wire MPX multi-wire servo plug- **Qty (2)**
  - Receiver to MPX: EF 6-inch 20 AWG servo extension- **Qty (4)**

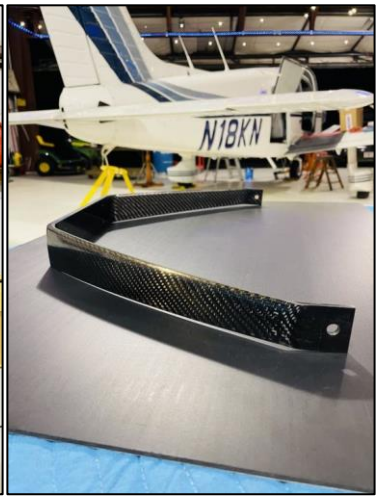
**all of these options are located at extremeflightrc.com*

A few tips to ensure success:

1. We are very pleased with the level of craftsmanship displayed by the builders in our factory. Through hundreds of grueling test flights containing maneuvers that no aircraft should be subjected to, our prototypes have remained rigid and completely airworthy. Having said that, it is impossible for us to inspect every glue joint in the aircraft. Take a few minutes and apply some thin CA to high stress areas such as the aileron servo mounting trays, landing gear mount, anti-rotation pins, wing and stab root ribs, etc.
2. Having survived the journey halfway around the world while experiencing several climate changes, it is not uncommon for a few wrinkles to develop in the covering. Fear not! These are not manufacturing defects and are easily removed with a little bit of heat. Use a sealing iron to go over all seams, stripes and sharp points in the covering scheme. You may want to apply a drop of clear fingernail polish at the tip of all sharp points to prevent them from lifting. To remove wrinkles, use a 100% cotton tee-shirt or microfiber cloth and your heat gun and heat the covering while gently rubbing the covering onto the wood with the t-shirt or cloth. Be careful not to use too much heat as the covering may shrink too much and begin to lift at the edges. Take your time, and a beautiful, paint like finish is attainable. If you need to repair any covering during the life of your aircraft, the colors are:
   - White/Red/Black/Charcoal/Silver color scheme:
     Ferrari Red #23, White #10, Silver #91, Black #71, Pearl Charcoal #77 (Oracover Colors)
     True Red-#HANU866, White-#HANU870, Silver-#HANU881, Black-#HANU874, Pearl Charcoal-#HANU846 (Ultracote colors)
   - White/Midnight Blue/Cub Yellow color scheme:
     Cub Yellow #30, Dark Blue #52, White #10 (Oracover colors)
     Cub Yellow-#HANU884, Midnight Blue- #HANU885, White-# HANU870 (Ultracote colors)
3. DO NOT SKIMP ON SERVOS! Your aircraft is equipped with very large control surfaces that deflect up to 45 degrees. A lot of servo power is required to prevent flutter and to maintain the required deflection for maneuvers. We absolutely recommend the use of METAL GEARED servos with a minimum of 300 oz. inches of torque.
4. Use a high quality epoxy for installing the composite control horns and hinges. We highly recommend the use of Pacer Z-Poxy 30 minute formula. We have used this glue for many years with zero failures. We also use the Loctite HYSOL brand epoxies with their very convenient application gun. If you need to clean any excess epoxy, we recommend a paper towel and denatured alcohol.
5. Your aircraft is built using very modern construction techniques and is very lightweight for its size. As with any high performance machine, regular inspection and maintenance is a must. While disassembling your aircraft after a flying session, pay close attention and inspect glue joints, linkages and loose covering to be sure the airframe is sound. A few minutes spent doing this will help maintain airframe longevity.
6. We recommend the use of blue Loctite thread locker when installing fasteners into your aircraft.

Landing Gear Installation

- Locate the carbon fiber landing gear, the Main Wheel hardware bag, two wheels, and two gear cuffs/fairings.
    - Tools required: 13mm socket and ratchet, 12mm wrench, 3.0mm and 1.5mm hex screwdriver
    - Supplies required: Clear silicon adhesive, blue thread locker, painters tape



- The gear has a front and a back. To identify the front, note that the gear sweeps slightly forward when installed. The best way to identify the sweep is to lay the gear on something flat.

- Use 4 screws and washers with blue thread locker and a 3.0mm hex screwdriver to install the landing gear as shown.

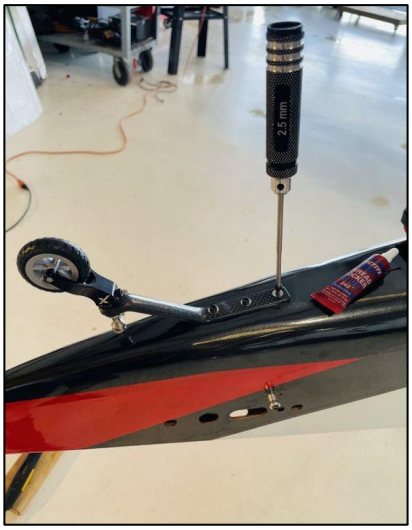
Landing Gear Installation

- Test fit the cuffs to the landing gear. We recommend rubberized adhesive to attach the cuffs. Place masking tape to protect the gear surface as shown, apply a large dollop of glue, slide on the cuff, and affix with masking tape until cured.

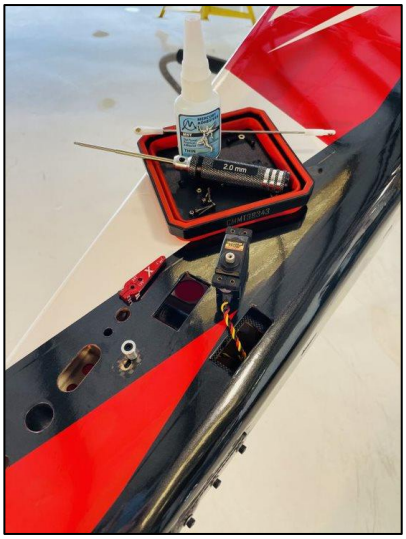
- Using a 13mm socket and a 12mm wrench attach the wheel axles to the landing gear by tightening the locking nuts as shown.

- Slide on the wheels, and the wheel spacers. Note the axles have flat areas to accept the wheel collar set screws. Put blue thread locker on the set screw, then install and tighten the wheel collars using a 1.5mm hex screwdriver.

Tailwheel and Servo Installation



- Locate the tailwheel, Tail hardware bag, tailwheel servo, 36in servo extension with a safety clip, and 1.25in servo arm.
- Using blue thread locker, mount the tailwheel to the fuselage using three screws and a 2.5mm hex screwdriver as shown.
    - Tools required: 2.5mm/2.0mm/1.5mm hex screwdriver, 4.0mm hex nut driver, forceps, drill, hobby knife
    - Supplies required: Thin CA with glue tip, blue thread locker



- Assemble the tailwheel pushrod with the nylon ball link ends as shown.
- Remove the covering over the tailwheel steering servo mount location using a hobby knife.
- Install the 36in servo wire extension with a safety clip onto the servo.

- Mount the servo with a 2.0mm hex screwdriver using a drop of thin CA on all servo screws.
- Install 1.25in servo arm with blue thread locker on both screws.
- Install the pushrod between the servo arm and the tailwheel arm with screws, washers, and locking nuts using a 1.5mm hex screwdriver and a 4.0mm hex nut driver or forceps.

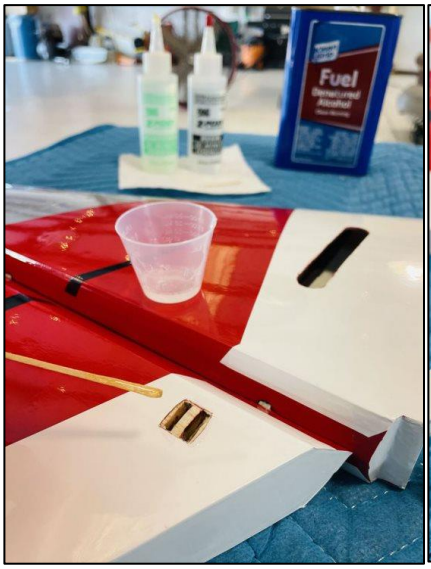
Vertical Stab and Rudder Servo Installation

- Locate the stab/rudder/extension block (it is pre-hinged for you), Rudder hardware bag, rudder servo, 48in wire extension with safety clip, and 2.0in servo arm.
  - Tools required: 2.5mm/2.0mm hex screwdriver, 5.5mm nut driver, vise grip, hobby knife
  - Supplies required: 30min epoxy, denatured alcohol, thin CA, painters tape, blue thread locker, sanding block

- Remove the wood tab on the bottom of the stab using a hobby knife as shown.
- Locate the control horns. Sand them lightly as shown in the area which will be glued. These control horns were spray painted white beforehand.

- Assemble the plastic ball links onto the pushrods, we use a cordless drill to assist. Note that the pushrods have one left hand, and one right hand thread.
- Assemble the horns with the square base plate, and the pushrod, with a screw, washers, and locking nuts as shown.

Vertical Stab and Rudder Servo Installation



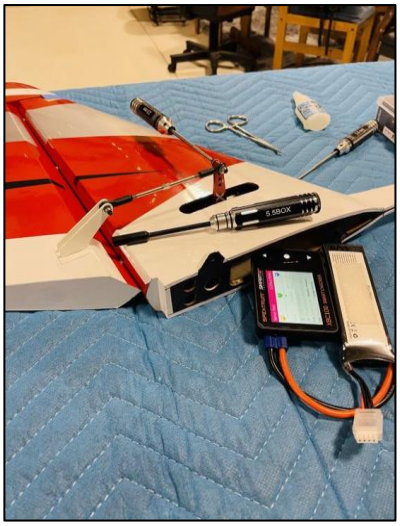
- Remove the covering in the area between the slots on the rudder as shown. Test-fit the horn assembly into the slots. It should be tight but should go in with moderate force. You may need to clean out the slots with the hobby knife.
- Place epoxy glue into the slots and onto the horns. Push the horns into the slot, seat it firmly. If any epoxy glue squeezes out, clean up with a paper towel soaked with denatured alcohol.

- Locate the rudder extension piece which mounts to the fuselage. Check its fit as shown. Glue to the fuselage with epoxy and use masking tape to hold the position while it cures.

- Mount your rudder servo. The servo mounts inside the vertical stab, go slowly and patiently as you place the servo into its mount. Make sure to route the servo wire through the hole. Note that the slot in the stab is placed to fit most common servos and arms, if your servo and arm combo happens to rub the wood, you can trim the slot using a hobby knife.

Vertical Stab and Rudder Servo Installation

- Mount the servo with a 2.0mm hex screwdriver using a drop of thin CA on all servo screws.



- Now is a good time to center your servo using your radio system or a servo tester.
- Install your servo arm, use blue thread locker on both the arm screws.
- Install the pushrod between the servo arm and the control horn with screws, washers, and locking nuts using a 2.5mm hex screwdriver and a 5.5mm hex nut driver.

- Because the pushrod has one left, and one right hand threads, you can adjust the length of the pushrod by rotating it. Adjust the length of the pushrod so that the servo arm is 90 degrees as shown when the rudder is centered.
- Run your servo wire extension through the plastic tube in the fuselage (now is a good time to also run your elevator and tailwheel servo extensions).
- Using the carbon mounting tube, install the stab onto the fuselage and attach with screws and large washers with blue thread locker.

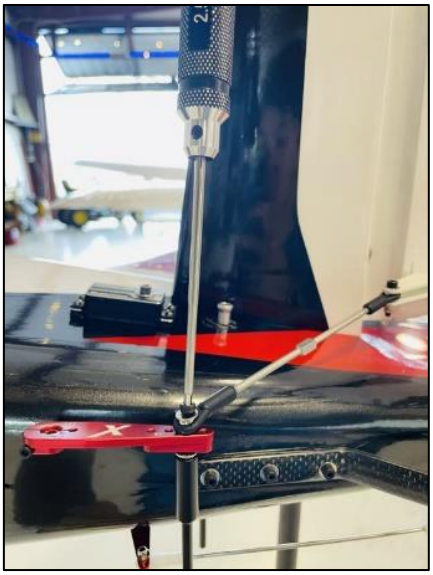
Horizontal Stab and Elevator Servo Installation

- Locate the horizontal stabs/elevators, the two fins, the Stab hardware bag, two elevator servos, two 36in servo extensions with safety clips, and two 2.0in servo arms. These elevators are pre-hinged for you.
  - Tools required: 2.5mm/2.0mm hex screwdriver, 5.5mm nut driver, forceps
  - Supplies required: 30min epoxy, denatured alcohol, thin CA, blue thread locker, sanding block

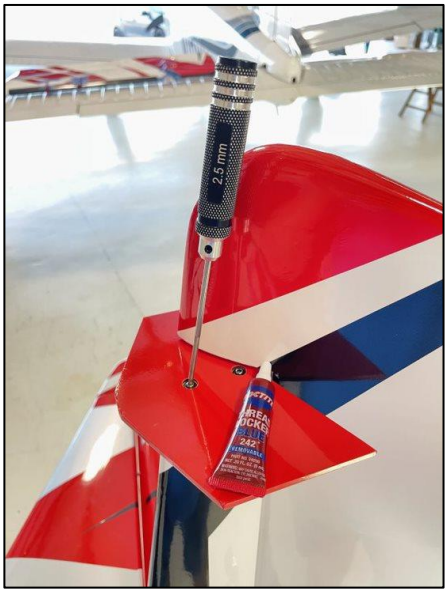
- Install the control horns exactly as you did on the rudder with epoxy and assemble the pushrods in the same way. These control horns were spray painted white beforehand.

- Locate the elevator servos, make sure they are centered. Plug them into the elevator wire extensions with a safety clip mount the servo with a 2.0mm hex screwdriver using a drop of thin CA on all servo screws.
- Using the front and rear carbon stab tubes, install the stabs and engage the stab locks.

Horizontal Stab and Elevator Servo Installation



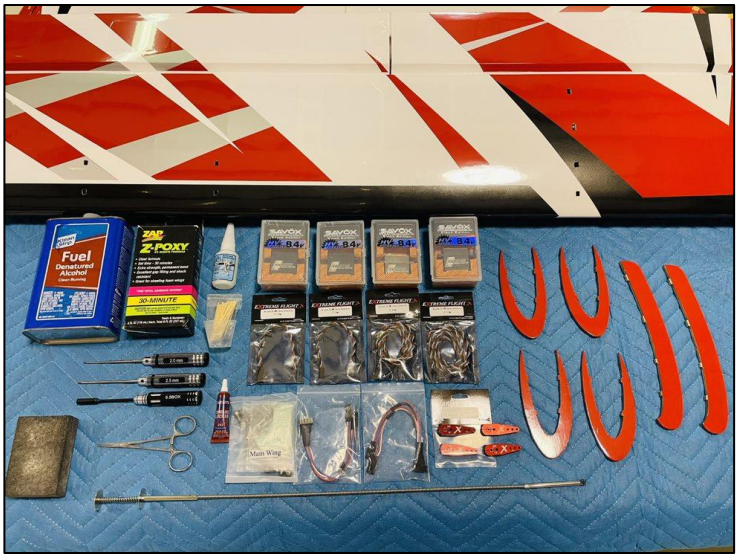
- Install the pushrod between the servo arm and the control horn with screws, washers, and locking nuts using a 2.5mm hex screwdriver and a 5.5mm hex nut driver.
- Install your servo arm, use blue thread locker on both the arm screws.



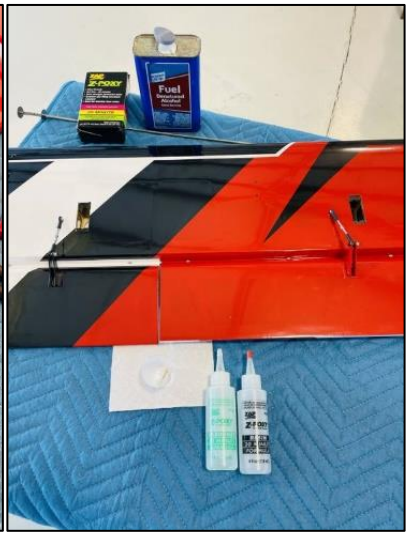
- Locate the blind nuts in stabs by poking a hole through the covering then install the fins with screws and blue thread locker as shown.

- Double check that the lock is engaged on the stab.
- Now is a good time to install both the 2-wire MPX multi-wire servo plug into the pre-fit locations in the fuselage using a 2.0mm hex screwdriver and EF socket head screws as shown.

Wing and Aileron/Flap Servo Installation



- Locate the two wings, Main Wing hardware pack, wing fences, two aileron/two flap servos, two 18in servo extension with safety clips, two MPX plugs, four 1.5in servo arms. The wings are pre-hinged for you.
    - Tools required: 2.5mm/2.0mm hex screwdriver, 5.5mm nut driver, forceps
    - Supplies required: 30min epoxy, denatured alcohol, thin CA, blue thread locker, sanding block, painters tape



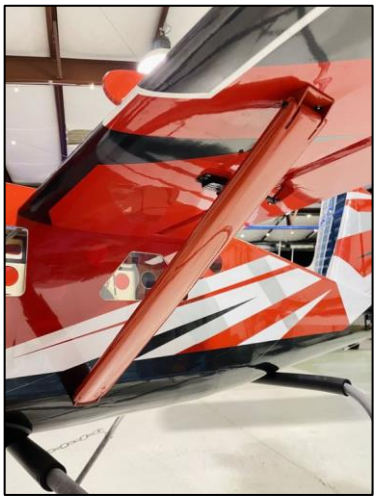
- Assemble the aileron and flap pushrods. All 8 control horns are identical. Sand and install them just as you did the rudder and elevator horns. These control horns were spray painted red and black beforehand.

- Attach your servo wire extension to the aileron servo and feed through the wing. Some servos will not need an extension in the flap location.
- Connect MPX plug to servo wires with safety clip.

Wing and Aileron/Flap Servo Installation

- Locate the aileron and flap servos, make sure they are centered. Plug them into the wire extensions with a safety clip then mount the servo with a 2.0mm hex screwdriver using a drop of thin CA on all servo screws.
- Install the pushrod between the servo arm and the control horn with screws, washers, and locking nuts using a 2.5mm hex screwdriver and a 5.5mm hex nut driver.
- Install your servo arm, use blue thread locker on both the arm screws.

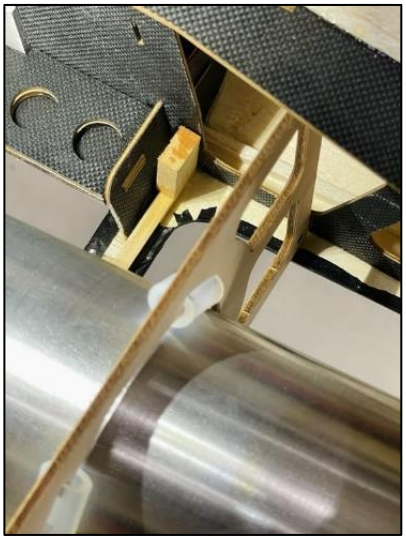
- Install the wing fence pieces onto the wing with epoxy glue. Clean up any excess epoxy with denatured alcohol.
- Locate four wing strut brackets and two struts. Install brackets to the wing and fuselage loosely, but do not fully tighten with a 2.5mm hex screwdriver and blue thread locker as shown.



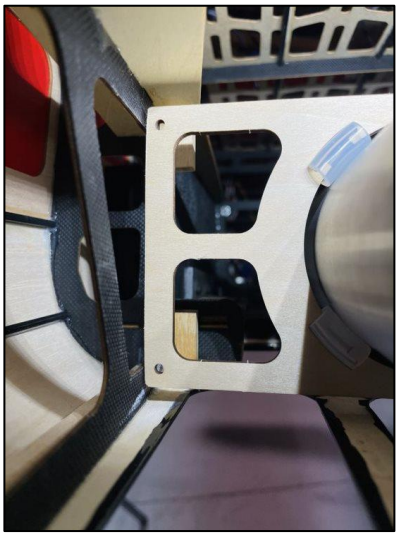
- Locate the two carbon wing tubes and slide into the fuselage. Slide the wings on the tubes all the way and close the wing latches inside the fuselage. Install the struts with long screws to both fuselage and wing brackets. Once the struts are installed, then we know the strut brackets are in the correct location. Tighten the strut bracket screws fully.

MTW 110H Rear Exit Canister Installation

- If the MTW canister is being used, then some slight modification is needed to get the can bracket to mount in the fuselage.
- Locate canister bracket, four rubber pieces, MTW canister, header, clamps.
    - Tools required: 4.0mm/2.0mm hex screwdriver, pliers, raver saw, hobby knife, covering iron
    - Supplies required: EF socket head screws, thin CA, four small wood blocks

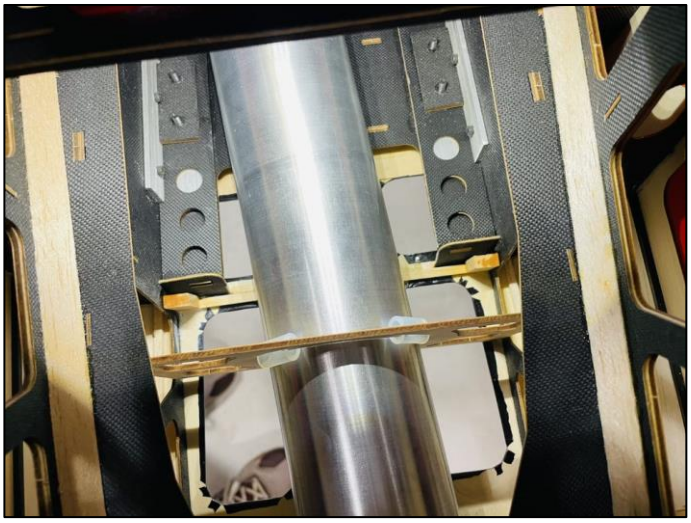


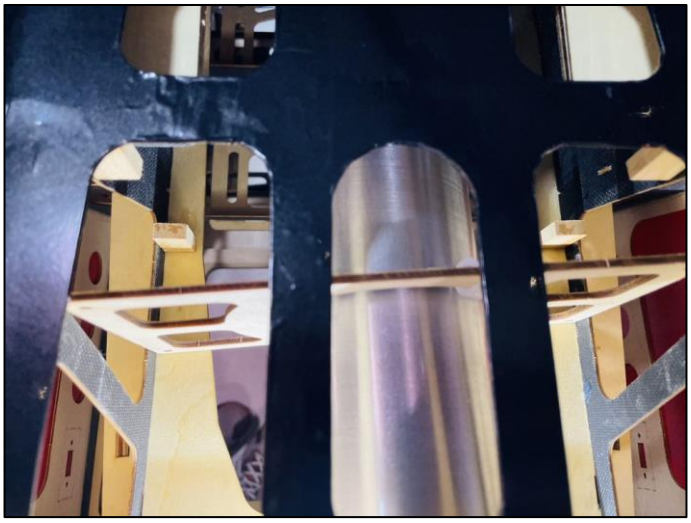
- Using a hobby knife remove the covering over the vents to provide cooling. There is an additional cooling vent bracket that can be installed to the rear if more cooling is needed.
- Install the four wood blocks into the fuselage using CA glue or epoxy. These wood blocks will be used to secure the canister bracket into the fuselage.

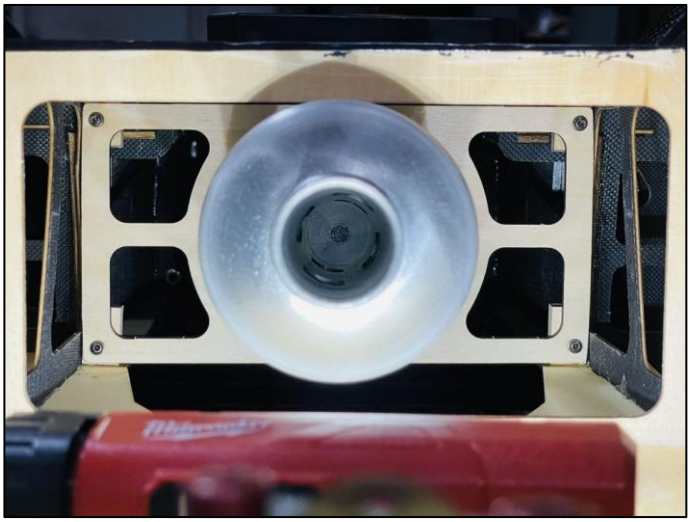


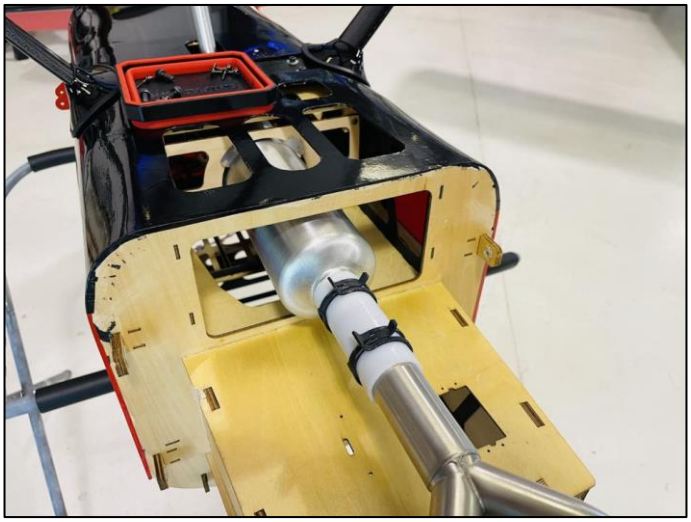
- Install the canister bracket with four EF socket head screws using a 2.0mm hex screwdriver.
- Connect the header to the canister with the provided clamps in the kit using pliers.

MTW 110H Rear Exit Canister Installation

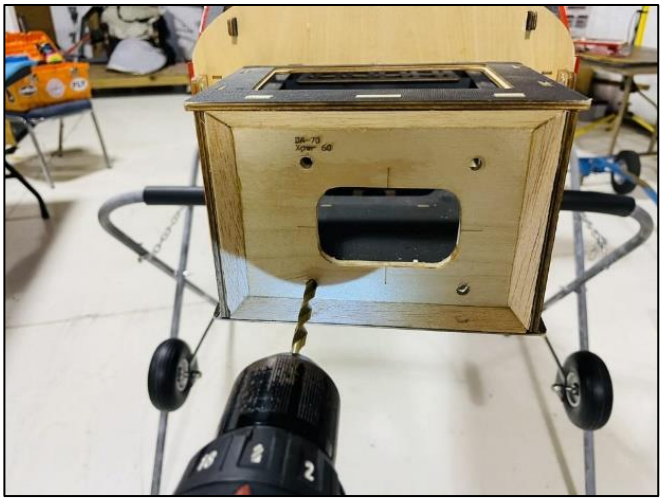




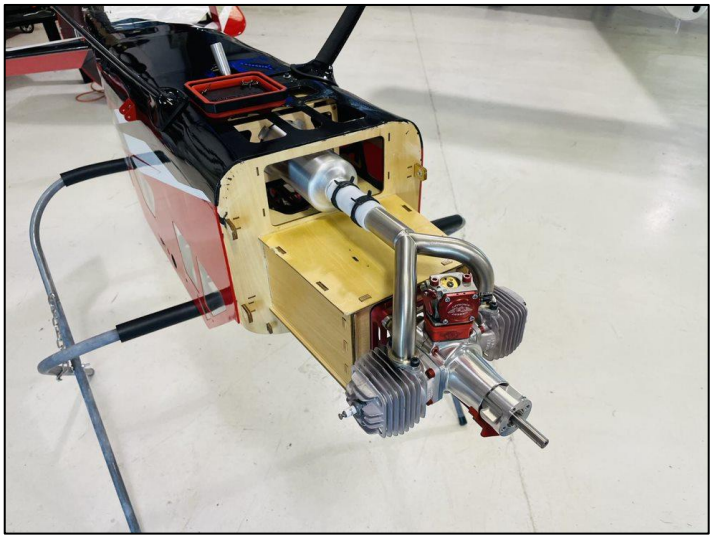


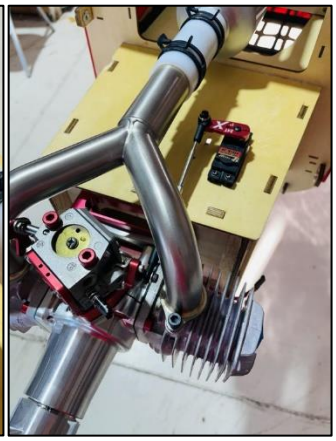


Engine and throttle servo Installation



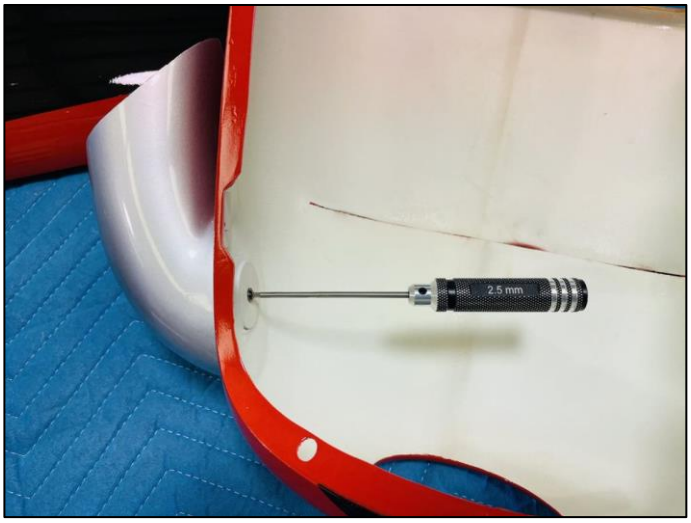
- The firewall of your aircraft is marked with bolt patterns for engine/motor mounting. Both fit the DA-70/GP-76 gas engines and XPWR 60cc brushless motor. Drill the marked holes.
- Use large washers and locking nuts on your engine mounting screws/bolts. Note that these engines are slightly different in overall length, and fiberglass cowls can vary slightly in length. So, the Blazing star mount includes spacers so you can set the distance from your spinner backplate to the cowl perfectly. Place the spacers between the aluminum mount and the firewall as necessary. We recommend 2-3mm spacing.



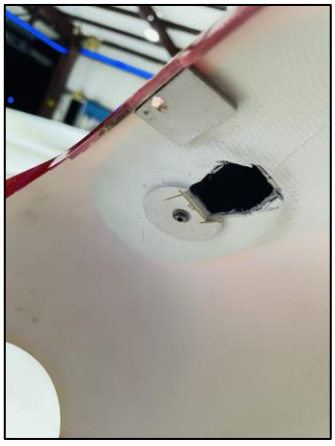


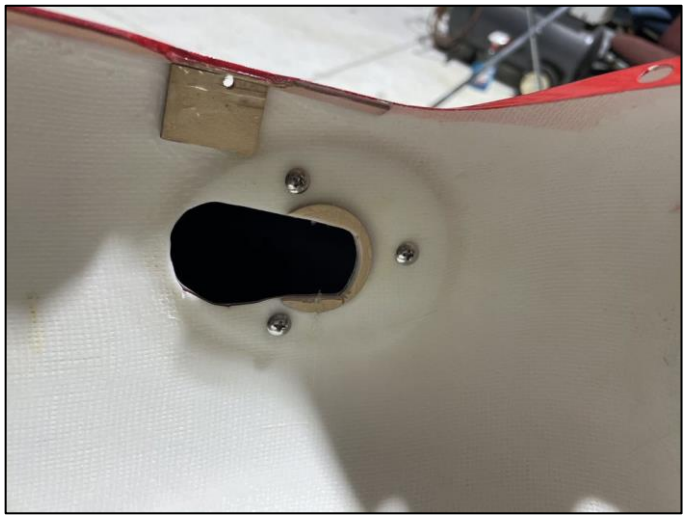
- Pictured is a typical throttle servo installation. Take care to ensure that the pushrod does not contact the motor box at any point in its travel.

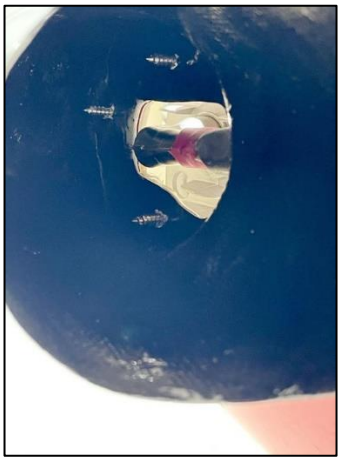
Mock Turboprop Exhaust Pipes Installation



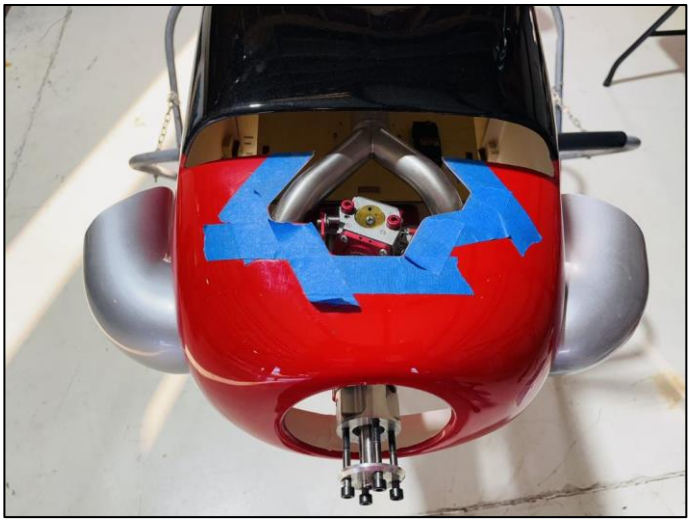
- Install the mock exhaust pipes using epoxy and screws with a 2.5mm hex screwdriver to help hold them in place.
- On some engines the ignition caps protrude so some trimming will be required. This can be done with a Dremel tool and multiple grits of sandpaper to get a smooth finish. Small woodscrews can be used to help hold the fiberglass muffler in place.



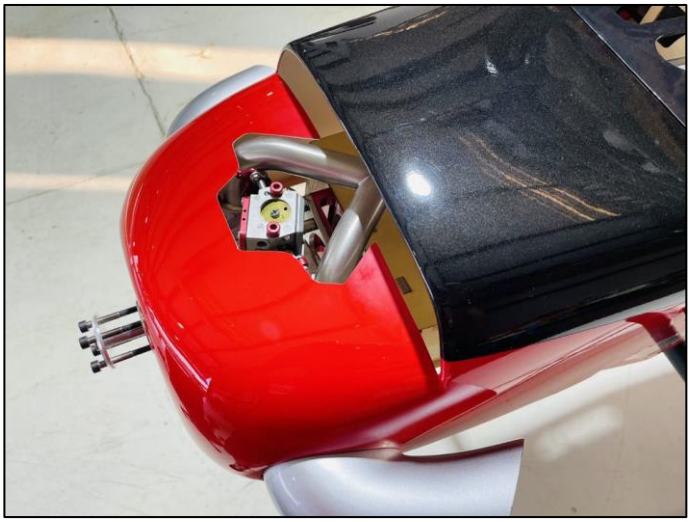




Cutting the Cowl and Dorsal Fin Installation



- When cutting the cowl, take time to properly mark from the inside where the carburetor protrudes and cut small amounts off.
- Use painters tape to protect the cowl while using a Dremel tool to make the cuts and multiple grits of sandpaper to get a smooth finish as shown



- Using a small amount of epoxy glue on the wooden tabs, install the dorsal fin on the bottom of the fuselage and secure with painters tape.

- Balance your aircraft. We recommend balancing it so that it simply hangs level when lifted by the main wing tube. This is our favorite balance point for all types of flying. Set your control throws according to the setup sheet in the front of this manual. Test your power system in a safe manner on the ground, and range-check your radio system. Verify that your control surfaces move in the correct directions before flight. The most common radio mix for the Bushmaster is to mix flaps to ailerons to give the function of large, full-span ailerons. This increases the roll rate. There are many other mixes you can experiment with on the Bushmaster. Check over the aircraft for any loose fasteners after the first flight and every several flights thereafter. We hope you enjoy your Bushmaster!

- Control settings:

    - Elevator: Low Rate 8-10 deg. 15-20% expo
    - 3D Rate 45 deg. 60-70% expo

    - Aileron: Low Rate 15-20 deg. 20-30% expo
    - High Rate 38-40 deg. 60-70% expo (For best roll rate, mix flaps to ailerons)

    - Rudder: Low Rate 20 deg 40-45% expo
    - High Rate 45 deg. 70-80% expo

    - Flaps: 40 degrees full deflection with 5% down elevator mix at full deflection