125" EXTRA 300
ARF

Assembly Manual



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

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Congratulations on your purchase of the new Extreme Flight RC 125" Extra 300. This airframe is the culmination of several years of design, revision and flight testing, resulting in a top quality competition grade aircraft. This airframe comes highly prefabricated allowing one to assemble and fly the Extra with minimal effort.

The Extra 300 was designed to excel at IMAC and invitational sequence flying. It is also a very capable 3D aircraft in the hands of an experienced pilot. The Extra's fuselage has been stretched to the maximum allowable limit providing for an aircraft that tracks extremely well and will certainly prove itself a contender in the upper classes of competition flying.

This aircraft is intended for experienced pilots with a thorough knowledge of giant scale aircraft power systems and radio/servo/linkage set-ups. As such the assembly manual is brief and outlines the important points that must be addressed that are unique to this airframe. Personal preference based on previous experience will dictate finishing details such as radio/battery installation, fuel tank choice, installation and plumbing, graphics choices and installation. If you are not experienced enough to make these decisions I highly recommend that you start with a smaller, less expensive aircraft in the 30cc-50cc range to learn the important basics of flying and maintaining gasoline powered aircraft before stepping up to such an expensive and potentially dangerous aircraft.

Extreme Flight RC, LTD. in no way accepts or assumes responsibility or liability for any damage, destruction of property, injury or death associated with the use of the final user assembled product. If you are not willing to accept any and all responsibility for the use of this aircraft please return it to the place of purchase immediately.

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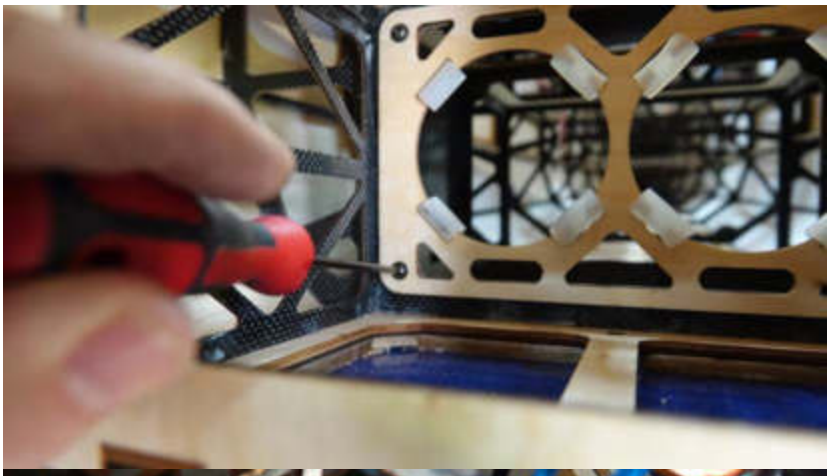
Extreme Flight 125" Extra V4 Assembly Manual Addendum

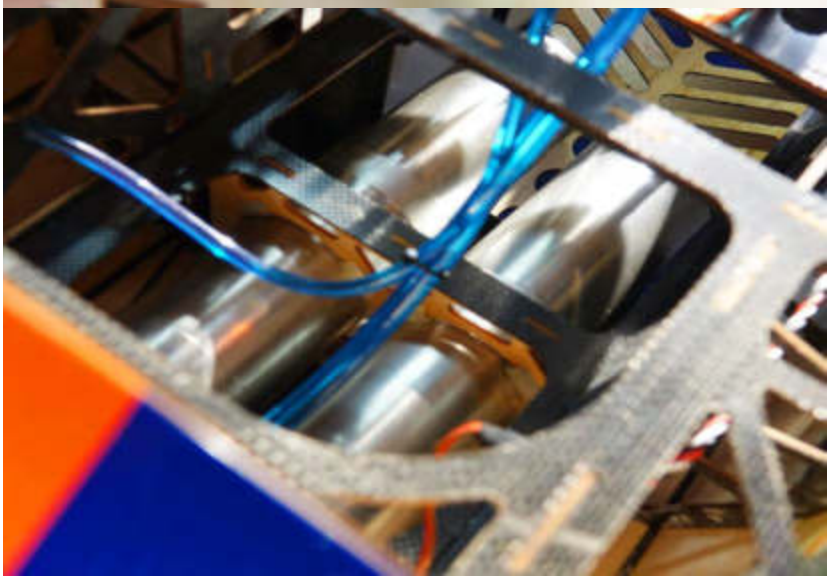
Congratulations on your purchase of the version 4 Extreme Flight 125" Extra 300! Many improvements have been made to the airframe and new composite laminate components have helped to reduce overall weight and add strength and rigidity. The result is a huge improvement over what was already a stellar airframe and the V4 is as competition capable as any high dollar custom kit built airframe for considerably less investment.

Some assembly steps and procedures have been changed to improve the assembly process and further enhance performance. The details of these changes are outlined here.

1. The balsa pipe tunnel structure has been removed to further reduce weight. There are laser cut plywood pipe and canister mounts included to make the mounting of these components fast and easy. There is plenty of room between the canisters/pipes and the surrounding airframe to allow for proper heat dispersion without affecting the interior structure. Please open the venting holes on the bottom of the fuselage to allow radiant heat from the canisters/pipes to leave the fuselage.

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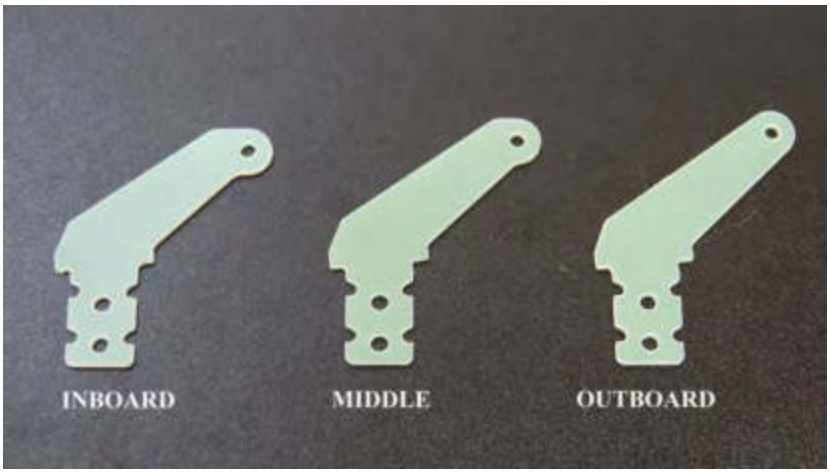




2. As in the V2 and V3 versions, the pocket hinging method has been replaced by the far superior pin hinge system in the V4 version. Besides being a maintenance nightmare, the pocket hinging system severely limited roll and snap rate. Performance has been greatly improved with this change.

3. There are 3 different control horn sets for each aileron. These accommodate the varying thickness of the aileron and keep the pivot point of the linkage the same distance from the hinge centerline. Please take notice of this and pay careful attention when gluing them in place.

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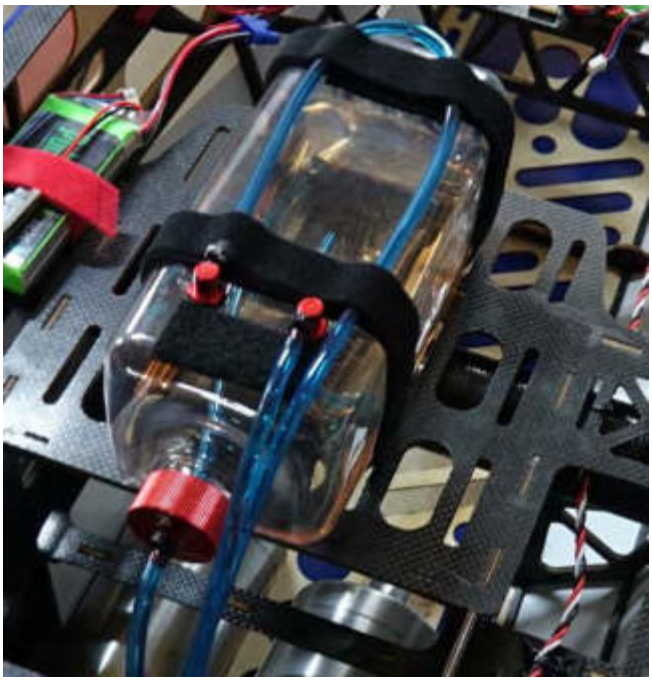


4. You will probably need to remove a bit of material from the plywood cowl ring to clear the left spark plug cap. Please see attached pic.

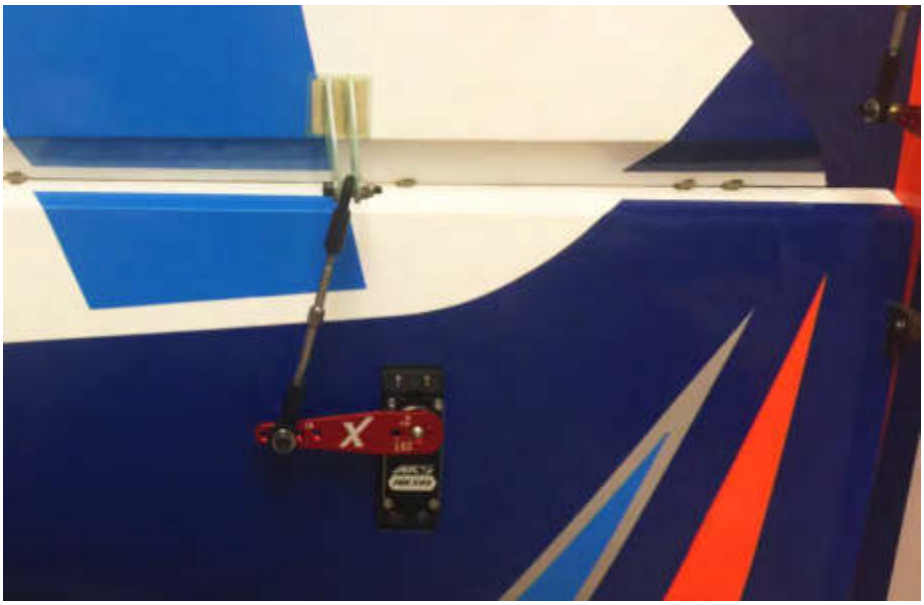


5. I mounted my tank with Velcro on the bottom of the tank and on the carbon surface of the tank tray. I also placed two strips of Velcro on the top of the tank so that the Velcro brand One Wrap straps have extra grip on the tank. This is a very secure method to mount the tank. Finally, I used 2 more Velcro straps to secure the overflow line.

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6. Elevator servo mounts have been moved to the bottom side of the horizontal stab in place of the internal mounts. This makes servo mounting and linkage setup much easier. If using a single servo for the elevator use the mounting position in the center of the elevator. An ultra torque servo like the MKS HV380 or 599 (or similar) is a **MUST!**



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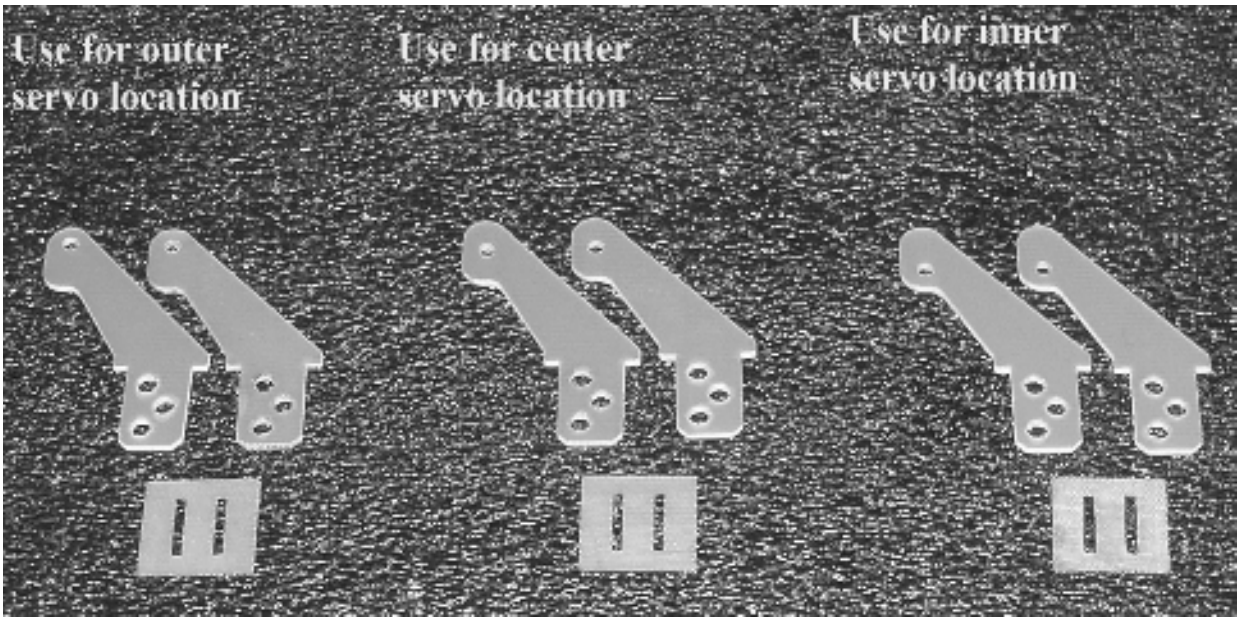
Wing assembly

(Please note that we highly recommend the use of 3 ultra torque servos for aileron actuation. We did extensive testing using both 2 and 3 servos and the gain in roll and snap performance using 3 servos is by far worth the investment in additional servos and the time required to properly set them up).

1. First I highly recommend that you take a few minutes and go over all seams with a covering iron on a medium setting, paying special attention to stripes and areas where covering overlaps.

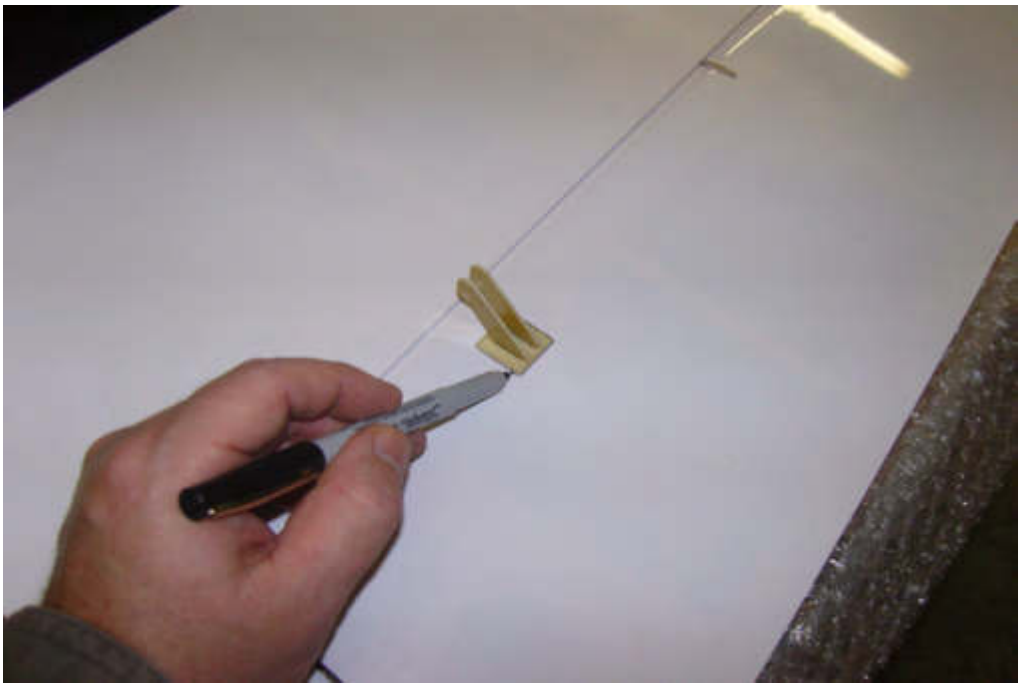
2. The ailerons use a unique pocket hinge system. There are two rods that act as the hinge pins for this system, one inserted at the tip of the wing, the other through the root. Use a flat head screw driver to back out the threaded portion of the rods and put a few drops of blue Loctite on each. Re-tighten the threaded portion into the threaded insert. Make sure to do this for both wings.

3. Next we'll install the aileron control horns. It is imperative that you pay close attention during this step. In order to provide the proper linkage geometry each set of aileron control horns has a hole drilled in a different location to compensate for the varying thickness of the wing and aileron. The picture below illustrates the proper location of each set of horns.



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4. Use a sharp hobby blade to remove the covering over the slots at each of the 3 locations where the dual truss control horns will be installed. Place the horns into the base and insert into the slots in the aileron. Trace around the base with a fine tipped felt marker.

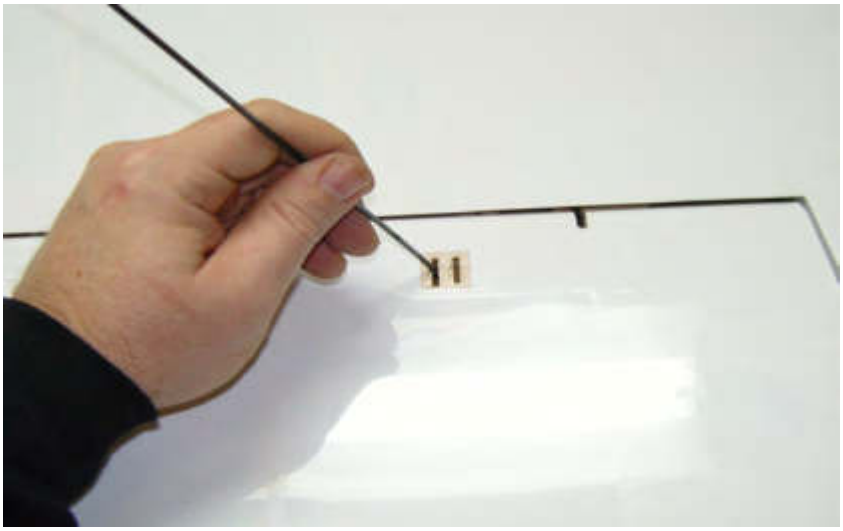


5. Use a sharp hobby blade to remove the covering 1/16" inside the line you have traced so that the fiberglass base plate will cover the exposed edges and prevent them from lifting.



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6. Scuff the portion of the control horns that will be glued into the aileron with sandpaper to remove the glossy sheen and clean with denatured alcohol. Mix up some 30 minute epoxy (I prefer Mercury Adhesives 30 minute formula). Use a piece of pushrod or old hobby blade to fill the slots in the aileron with epoxy. Coat the entire area of the horns that will insert into the aileron and the bottom of the base plate with epoxy. Insert the horns into the slot and push down until they are flush with the base plate. Use a paper towel soaked with denatured alcohol to remove the excess epoxy. Insert a 3mm bolt through the holes in the horn to insure proper alignment. Repeat this process for the remaining control horns.





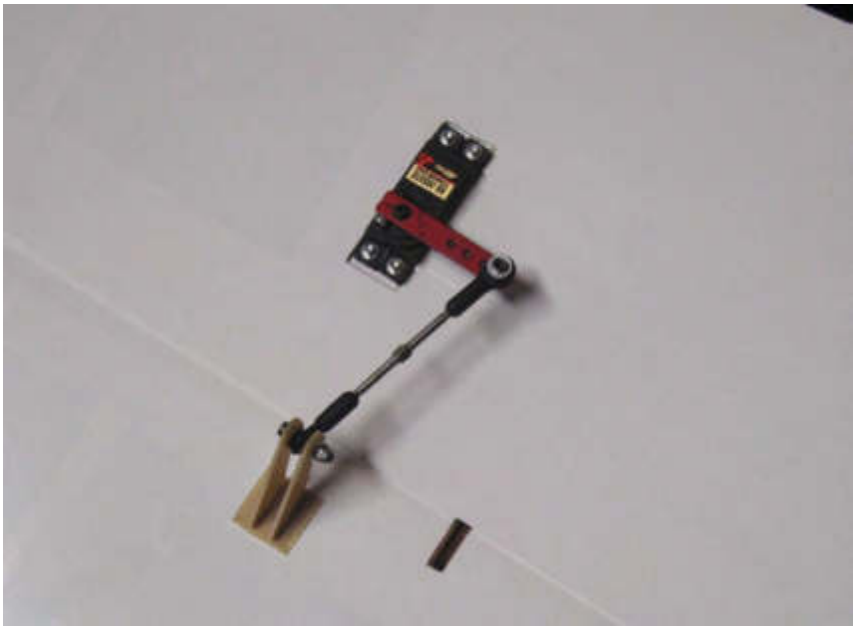
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7. Use a sharp hobby blade to remove the covering at the location of each servo and seal the edges with a hot trim iron. Take a few minutes and saturate all joints of the servo mounting trays with CA.



8. Use the manufacturer supplied hardware to mount the servos in their proper location with the servo shaft toward the trailing edge of the wing. You will need to use 1- 36", 1-24", and 1-12" extension to get the servo leads out of the wing. We recommend the use of a 1.5 inch aluminum servo arm. Thread 2 ball links onto the titanium pushrod and install the pushrod as shown in the picture using the supplied hardware. It will be necessary to place a washer on each side of the ball link between the brass ball and the fiberglass control horn to prevent binding.

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9. It is highly recommended that you use a servo programmer, Matchbox or power distribution unit to make sure all 3 servos work in unison. We use the Hitec 7955s and 7950s in our aircraft in conjunction with the Hitec programmer and have been able to get the servos matched perfectly with very little current draw.

<u>Elevator/stab assembly</u>

10. Just as you did with the wings, take a few moments to go over all the seams and stripes with a hot iron to ensure all edges are sealed.

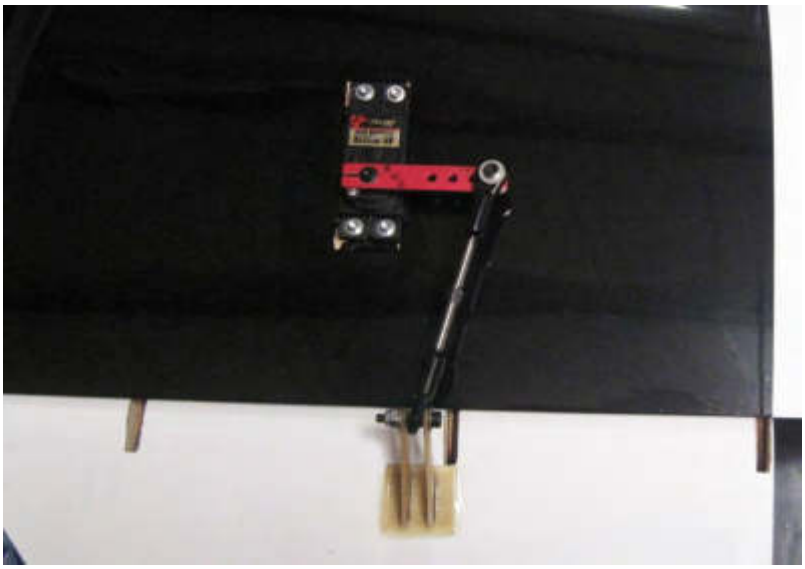
11. Use a flat head screw driver to back out the threaded portion of the hinge pin rod at the root of the elevator. Place a couple drops of blue Loctite on the threads and re-tighten the hinge pin rod. Repeat for the other stab/elevator half.

12. There are provisions to use 2 elevator servos per half included with the Extra. We have found one ultra torque servo to be sufficient (Hitec 7955 or 7950, JR 8711 HV, Futaba 9156 or 9157). If using a single servo use the servo mount furthest outboard on the stab and the corresponding elevator horn slot.

13. Using the same technique as with the aileron mount the elevator control horn as shown. All of the elevator horns are identical.

14. Install your servo using the manufacturer supplied mounting hardware with the output shaft oriented toward the trailing edge of the stab. Thread a ball link onto each end of the threaded titanium pushrod and install using the supplied hardware as shown in the picture. We use a 1.5 inch aluminum servo arm for elevator actuation. If setting up the Extra for precision aerobatics only we suggest using a 1 inch arm for better resolution.

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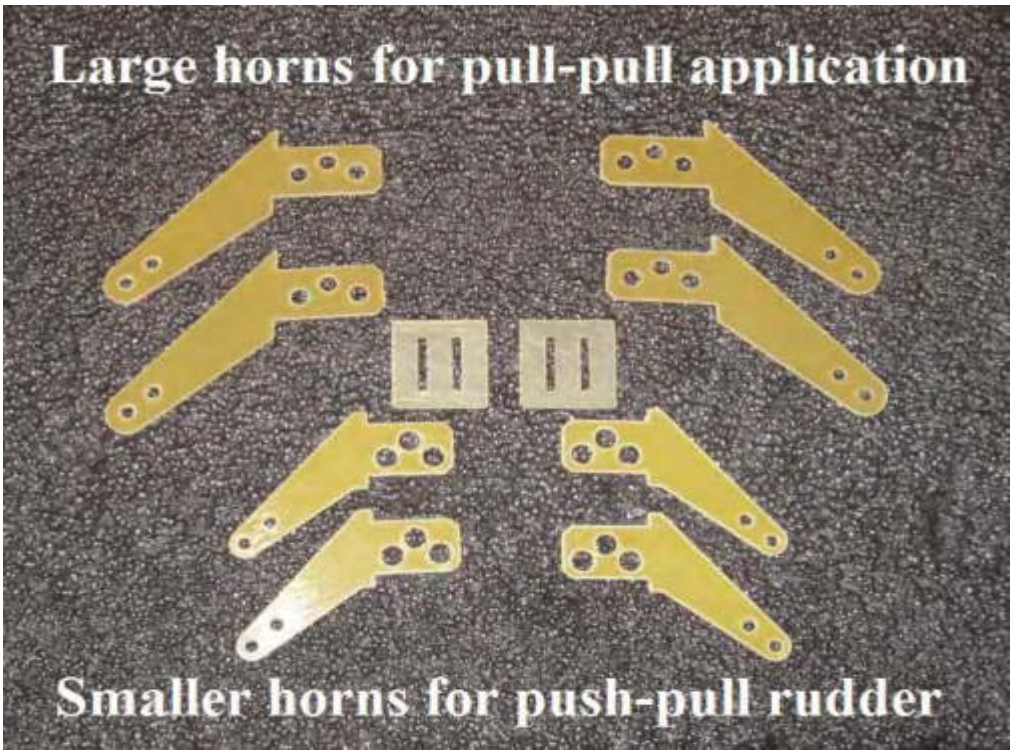


Rudder preparation and installation

15. This step is also very important-please pay close attention. There are 2 sets of control horns provided for the rudder. The larger horn set is to be used if you intend to use a pull-pull set-up with the rudder servos mounted inside the fuselage under the canopy. If using 4 elevator servos it is recommended that you use the pull-pull option to help achieve proper CG. A 5 inch servo arm is recommended for proper geometry.

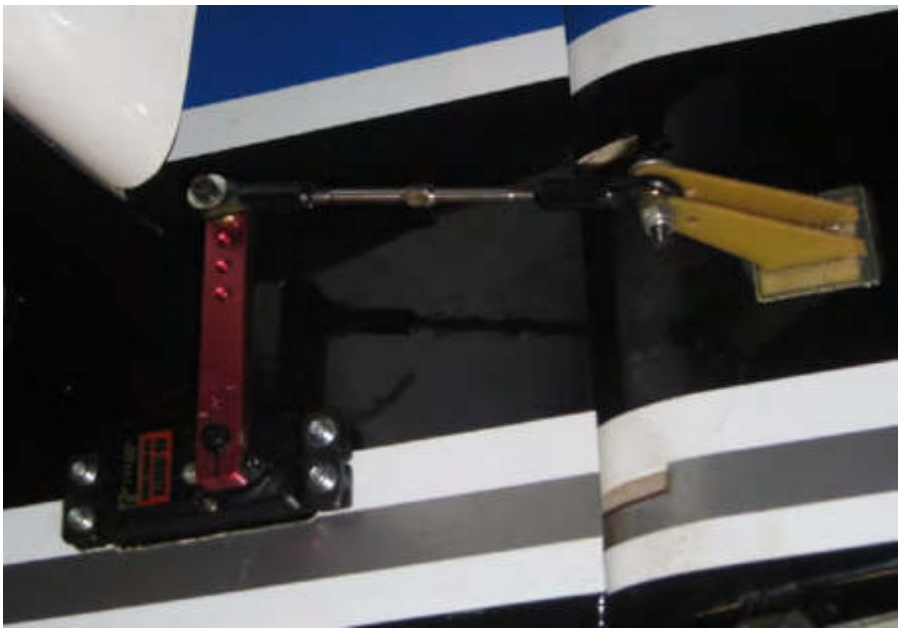
The smaller horns are to be used if you use a direct drive push-pull linkage with 2 servos mounted in the rear of the fuselage. This is the preferred method as it is much easier to set up and provides a more direct and powerful means of rudder actuation. These horns are the same as used for the elevators.

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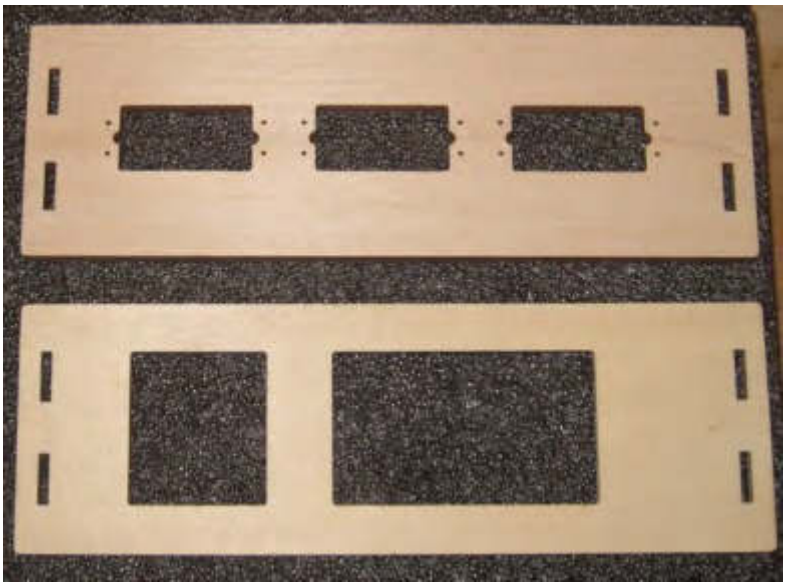


16. Using the same methods as used previously with the ailerons and elevator, install the fiberglass rudder horns on each side of the rudder. The rudder is hinged using the same method as with the ailerons and elevators. Place a few drops of blue Loctite on the threaded portion of the rudder hinge pin and insert into rudder. Tighten using a flat head screwdriver. The picture below shows the completed assembly using the direct drive push-pull method. We are using 2 inch servo arms. Please note that the output shaft is oriented toward the rear of the aircraft. This same set-up is to be repeated on the other side of the fuselage. The use of 2 ultra torque servos such as the Hitec 7950, JR 8711HV or Futaba 9157 is mandatory.

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17. There are 2 additional plywood trays included to accommodate various pull-pull set-ups. One tray allows the use of up to 3 standard size high torque servos ganged together. The additional hardware required for this set-up <u>is not</u> included in this kit. Also included is a tray to allow the use of a single Seiko industrial grade servo. These trays are tabbed to glue into fuselage under the canopy.



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Fuselage assembly

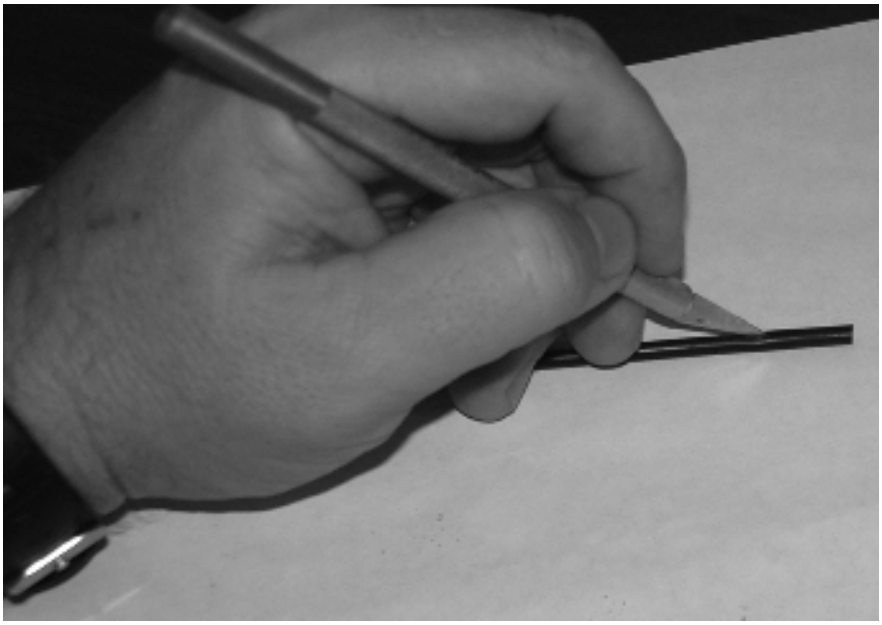
18. Let's start by getting the landing gear mounted. Use the supplied 8mm bolts, nylon insert lock nuts and washers to mount the carbon fiber landing gear to the bottom of the fuselage. The straight portion of the gear leg should be oriented toward the front of the aircraft.





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19. The landing gear fairings add a nice scale touch to the aircraft but are not necessary. If you wish to use them, slit the supplied black neoprene tubing length wise with a sharp hobby knife. Push the tubing onto the rim of the fairing and secure with CA. Attach the fairing to the gear with "Goop" silicon glue. Alternately you can secure them with a small screw as shown in the photo above.

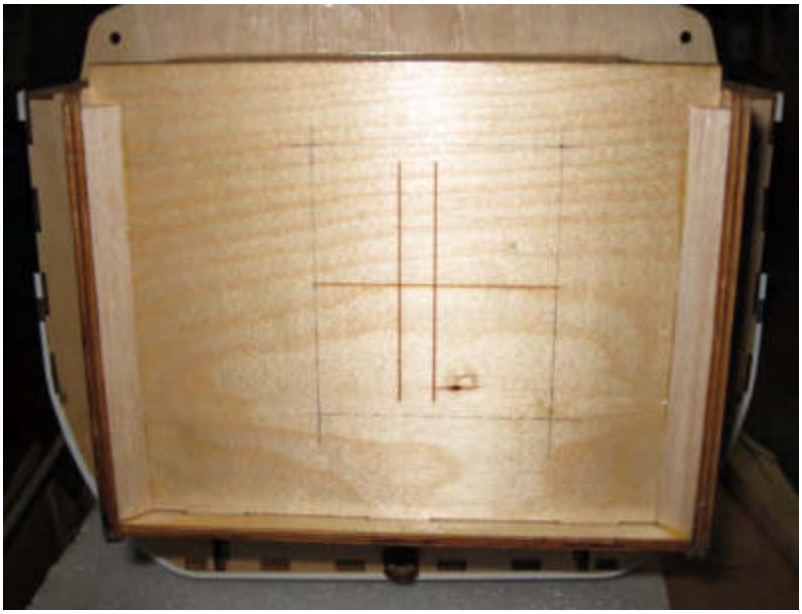




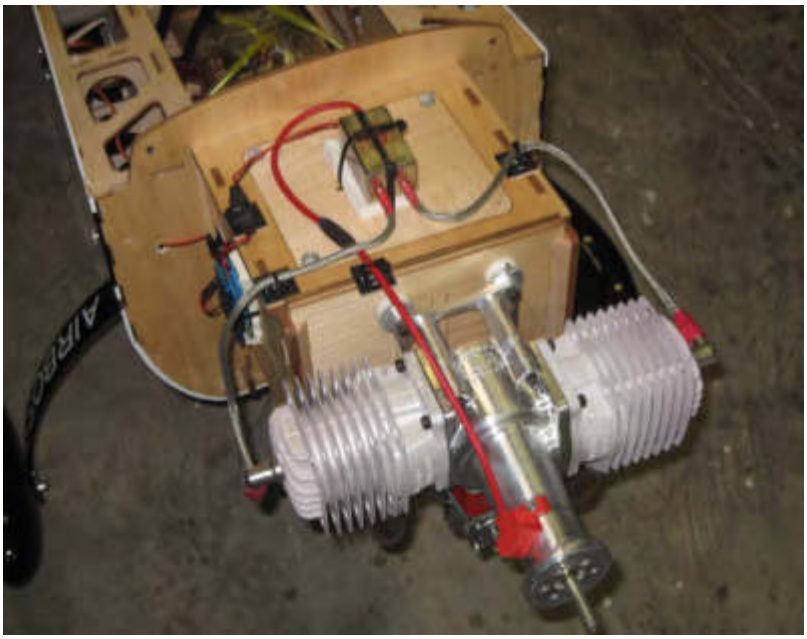
20. Install the supplied axles, wheels and pants onto the carbon fiber landing gear.

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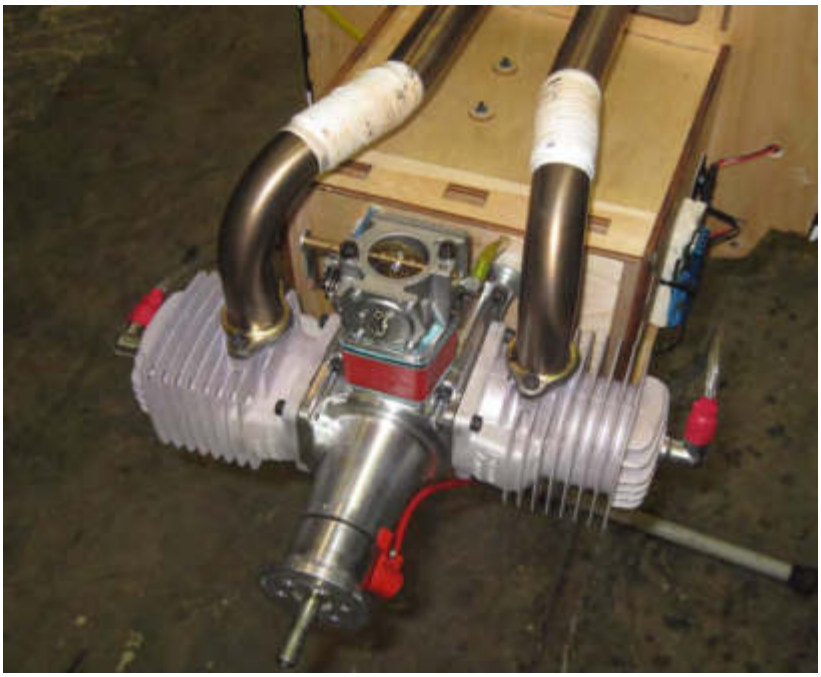
21. Mounting the engine is quite easy. There are laser inscribed reference marks on the front of the engine mounting plate. When looking at the front of the mounting plate the vertical line to the right of the center line should be used to allow for right thrust offset to counter spiral slipstream effect. The distance from the face of the engine mounting plate to the engine drive washer should be 8 1/8 inches. Use standoffs to achieve this length.



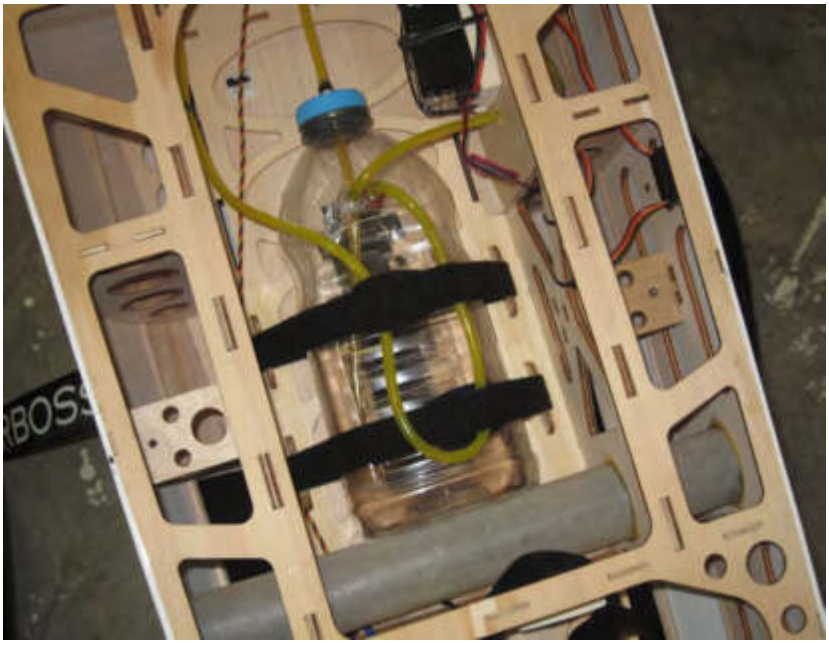
Here are a couple of photos showing the installation of the DA-170 in our Extra.



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22. There are plywood tabs supplied for mounting your fuel tank. These are pushed up from inside the pipe tunnel and should be secured with epoxy. Due to the wide range of engines that will be used a gas tank is not provided. We have started making our own tanks from 64 ounce juice bottles using brass fittings available from B&B Specialties. Please see the following picture showing our home made tank and installation.

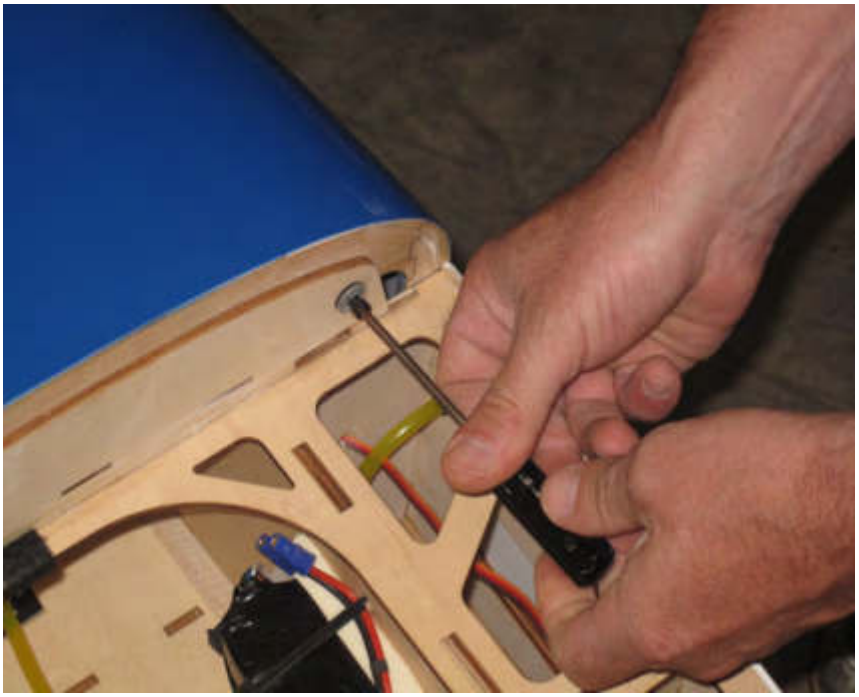


23. Throttle servo installation and linkage set-up will depend on the requirements of the engine you are using. As such there are no provisions supplied for the mounting of the throttle servo.

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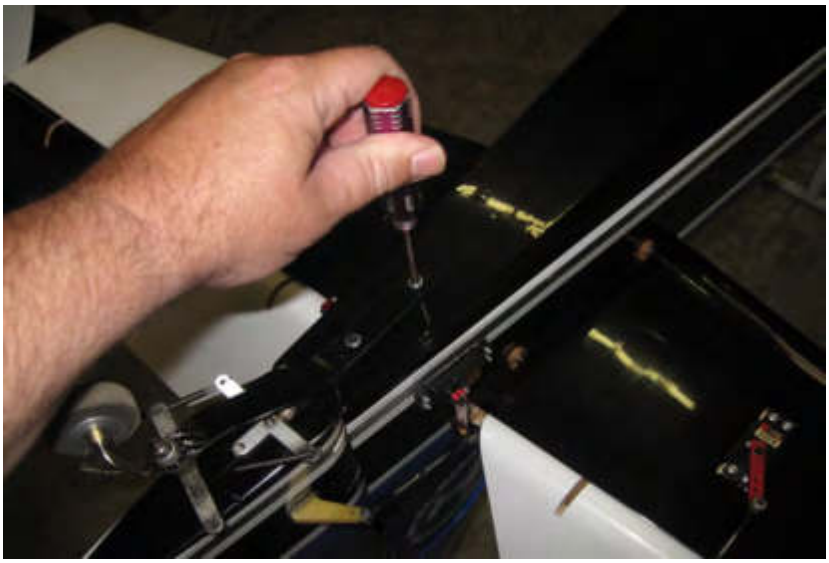
24. Cowl mounting is very easy! The cowl is secured with 3 4mm screws. It is best to insert the longest of the 3 screws into the bottom of the cowl and secure first, then the top 2 screws as shown. Be sure to use a washer and a generous amount of blue Loctite to prevent the screws from backing out.





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25. There are 2 blind nuts pre-installed in the rear bottom of the fuselage for mounting the carbon fiber tail wheel assembly. Before installing this assembly, file flat spots on the tail wheel wire so that all set screws from the various collars seat properly. Use a drop of blue Loctite on each setscrew.



26. Install the tiller arm on the bottom of the rudder along with the supplied springs which will steer the tail wheel.

27. Secure the stabs to the fuselage with the supplied 3mm bolts and washers, making sure to use a generous amount of blue Loctite to prevent the bolts from backing out.



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28. Installation of batteries and radio equipment is up to the end user and will depend on the equipment you choose to use. There are four laser cut holes in the fuselage that will accept the JR PA004 Super Switch and various other units from other manufacturers.

29. The wing is secured to the fuselage using a combination of a 1/4-20 nylon bolt inserted into the wing from inside the fuselage at the rear of the chord and into the pre-installed blind nut in the wing root and a 4mm bolt that inserts into the tongue that protrudes from the wing. This bolt is secured in the fuselage using the pre-installed blind nut.

This completes the assembly process for the Extra. The Center of gravity for the Extra is on the center of the wing tube. You may prefer it slightly in front of or behind this position depending on your flying style. One of the easiest methods to check CG on an aircraft of this size is to tie a thin rope around the wing tube on each side of the fuselage. Slide the wings into position and install the canopy. Lift the aircraft using the rope and adjust the position of your batteries and radio gear to achieve proper balance.

<u>Please note:</u> The high quality airfoiled carbon fiber landing gear is very lightweight and plenty strong to handle normal landings. It will not handle side loads well. Be sure to bleed off speed when landing before making a turn to prevent from collapsing the gear. Periodically inspect the carbon fiber landing gear and carbon wing and stab tubes for signs of distress and replace if necessary.

Thanks again for your purchase of the Extreme Flight RC 40% Extra 300 ARF. We hope it brings you as much excitement and joy as we have experienced flying ours.

See ya at the flying field!

Chris Hinson

Extreme Flight RC

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