U-Can-Do™ SF

INSTRUCTION MANUAL

SPECIFICATIONS

Wingspan: 59 in [1500mm]
Length: 58 in [1475mm]
Weight: 6.5–7.25 lb [2950–3290 g]
Wing Area: 912 in² [58.8 dm²]
Wing Loading: 16–18 oz/ft² [49–55 g/dm²]

Radio: 4-channel minimum with 5-6 servos and standard size receiver

Engine: .55-.65 [9-10.5cc] two-stroke glow engine or .82 [13.5cc] four-stroke glow engine

Electric Power: RimFire™ .80, (50-55-500) Outrunner Brushless

WARRANTY

Great Planes® Model Manufacturing Co. guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. **In no case shall Great Planes' liability exceed the original cost of the purchased kit.** Further, Great Planes reserves the right to change or modify this warranty without notice.

In that Great Planes has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

To make a warranty claim send the defective part or item to Hobby Services at the address below:

Hobby Services
3002 N. Apollo Dr. Suite 1
Champaign IL 61822 USA

Include a letter stating your name, return shipping address, as much contact information as possible (daytime telephone number, fax number, e-mail address), a detailed description of the problem and a photocopy of the purchase receipt. Upon receipt of the package the problem will be evaluated as quickly as possible.

READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

GREAT PLANES® MODEL MANUFACTURING COMPANY

Champaign, Illinois
(217) 398-8970, Ext 5
airsupport@greatplanes.com

TABLE OF CONTENTS

INTRODUCTION

The U-Can-Do SF has the impressive flight characteristics of the original version with a refined design to speed up assembly, a fresh appearance with a new trim scheme, and now the provisions for a brushless setup. Like all of the latest Great Planes ARFs, many of the tasks typically required to be done during assembly have already been completed for you at the factory including pre-hinged ailerons and rudder, pre-glued canopy, and trimmed covering.

For the latest technical updates or manual corrections to the Great Planes U-Can-Do SF ARF visit the Great Planes web site at www.greatplanes.com. Open the “Airplanes” link, then select the U-Can-Do SF ARF. If there is new technical information or changes to this model a “tech notice” box will appear in the upper left corner of the page.

Academy of Model Aeronautics

We urge you to join the AMA (Academy of Model Aeronautics) and a local R/C club. The AMA is the governing body of model aviation and membership is required to fly at AMA clubs. Though joining the AMA provides many benefits, one of the primary reasons to join is liability protection. Coverage is not limited to flying at contests or on the club field. It even applies to flying at public demonstrations and air shows. Failure to comply with the Safety Code (excerpts printed in the back of the manual) may endanger insurance coverage. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. There are over 2,500 AMA chartered clubs across the country. Contact the AMA at the address or toll-free phone number below:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302-9252

Tele. (800) 435-9262
Fax (765) 741-0057

AMA SINCE 1936

Or via the Internet at: http://www.modelaircraft.org

IMPORTANT!!! Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.

SAFETY PRECAUTIONS

Protect Your Model, Yourself & Others…
Follow These Important Safety Precautions

1. Your U-Can-Do SF ARF should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, the U-Can-Do SF, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.

2. You must assemble the model **according to the instructions**. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.

3. You must take time to **build straight, true** and **strong**.

4. You must use an R/C radio system that is in first-class condition, and a correctly sized engine and components (fuel tank, wheels, etc.) throughout the building process.

5. You must correctly install all R/C and other components so that the model operates correctly on the ground and in the air.

6. You must check the operation of the model before **every** flight to ensure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.

7. If you are not an experienced pilot or have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

8. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if an engine larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

9. **WARNING:** The cowl and wheel pants included in this kit are made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into a part to remove fiberglass dust, as the dust will blow back into your eyes. Always wear safety goggles, a particle mask and rubber gloves when grinding, drilling and sanding fiberglass parts. Vacuum the parts and the work area thoroughly after working with fiberglass parts.

We, as the kit manufacturer, provide you with a top quality, thoroughly tested kit and instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.

REMEMBER: Take your time and follow the instructions to end up with a well-built model that is straight and true.

DECISIONS YOU MUST MAKE

This is a partial list of items required to finish the U-Can-Do SF that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

Radio Equipment

The U-Can-Do SF requires a minimum 4-channel radio system with a minimum of five 72 oz.-in. [5.2 kg-cm] minimum torque standard sized servos and an additional standard torque servo if you are installing a glow engine.

For maximum 3D performance, we recommend using digital servos with at least 72 oz.-in. [5.2 kg-cm] of torque.

In addition, two 12" [305mm] servo extensions are required for the aileron servos and three 24" [610mm] servo extensions are required for the tail servos. A 6" [152mm] servo extension is required for the ESC if you are installing a brushless motor. If you are using a radio system that does not support mixing functions, a Y-harness will also be required to connect the aileron servos to the receiver. You will also need a reversing Y-harness to reverse the rotation of one of the elevator servos in order for both elevator halves to move together in the same direction.

Recommended part numbers for the radio components are provided below:

- ❍ Futaba S3010 Standard High-Torque BB Servo (FUTM0043)
- ❍ Futaba S3050 Digital Standard High Torque BB MG Servo (FUTM0300)
- ❍ Futaba S3004 Standard Ball Bearing Servo (FUTM0004)
- ❍ Hobbico 6" Extension Futaba J (HCAM2000)
- ❍ Hobbico 12" Extension Futaba J (HCAM2100)
- ❍ Hobbico 24" Extension Futaba J (HCAM2200)
- ❍ Futaba Dual Servo Extension 6" J (FUTM4130)
- ❍ EMS Servo Reverser Futaba J (EMOM0027)
- ❍ Ernst Charge Receptacle Futaba J FM (ERNM3001)
- ❍ Futaba SWH13 Switch Harness & Charge Cord Mini J (FUTM4370)
- ❍ Great Planes Heat Shrink Tubing 3/8x3" (3) (GPMM1060)

If you plan to install a brushless motor, the availability of space on the battery tray will limit you to a standard 4.8V receiver battery (larger batteries may fit inside the fuselage but there are no provisions for mounting them). If you installed a glow engine, a standard 4.8V receiver battery or a high energy 6.6V LiFe battery can be used. The high energy density and 6.6V nominal voltage rating would be a good match for this 3D model. The installation of a LiFe battery is shown in the manual. A charger capable of safely charging a LiFe battery is also required. Recommended part numbers are provided:

- ❍ Hobbico HydriMax NiMH 4-Cell 4.8V 2000mAh Flat AA Rx U (HCAM6321)
- ❍ Hobbico LiFeSource LiFe 6.6V 2100mAh 10C Receiver U (HCAM6436)
- ❍ Hobbico LiFeSource AC/DC Balancing Charger 1S-3S (HCAM6375)

Glow Engine Recommendations

The recommended engine/motor size for the U-Can-Do SF is a .55–.65 cu in [9–10.5cc] two-stroke engine or .82 [13.5cc] four-stroke engine. Choose a propeller based on the engine

manufacturer's recommendation. The order number for the recommended engine is provided below. If you plan to install the recommended O.S. engine, we found that the APC 13 x 6 propeller works well.

- ❍ O.S. 65AX ABL w/Muffler (OSMG0558)
- ❍ APC 13x6 Sport Propeller (APCQ1306)

Brushless Motor Recommendations

If you are planning on using electric power, we recommend the RimFire .80 brushless motor and a 60A ESC. A 15x6 electric propeller is a good choice with the recommended motor. Many batteries will work as a flight battery. We suggest the 22.2V 3350mAh EON-X Flight Power pack. Part numbers are provided below:

- ❍ Great Planes RimFire .80 50-55-500 Outrunner Brushless (GPMG4740)
- ❍ Great Planes Silver Series 60A Brushless ESC High Volt (GPMM1850)
- ❍ APC 15x6 Thin Electric Propeller (APCQ1505)
- ❍ FlightPower LiPo EON-X 30 6S 22.2V 3350mAh 30C (FPWP6358)

It is recommended to make a battery lead extension if installing a brushless motor. Part numbers needed to make the extension are as follows:

- ❍ W.S. Deans® Female Ultra Plug® w/Pigtail (WSDM3010)
- ❍ W.S. Deans® Male Ultra Plug® (2) (WSDM1302)

If you need a charger for your flight battery, we suggest either the Triton EQ or Triton 2 EQ. Both are very versatile chargers that can charge virtually any hobby battery currently available.

- ❍ Great Planes ElectriFly Triton EQ AC/DC Charger (GPMM3155)
- ❍ Great Planes ElectriFly Triton2 EQ AC/DC Charger (GPMM3156)

ADDITIONAL ITEMS REQUIRED

Required Hardware & Accessories

This is the list of hardware and accessories required to finish the U-Can-Do SF. Order numbers are provided in parentheses:

- ❍ R/C foam rubber 1/4" [6mm] (HCAQ1000)
- ❍ 3' [900mm] standard silicone fuel tubing (GPMQ4131) (glow engine only)

Adhesives and Building Supplies

This is the list of Adhesives and Building Supplies that are required to finish the U-Can-Do SF ARF:

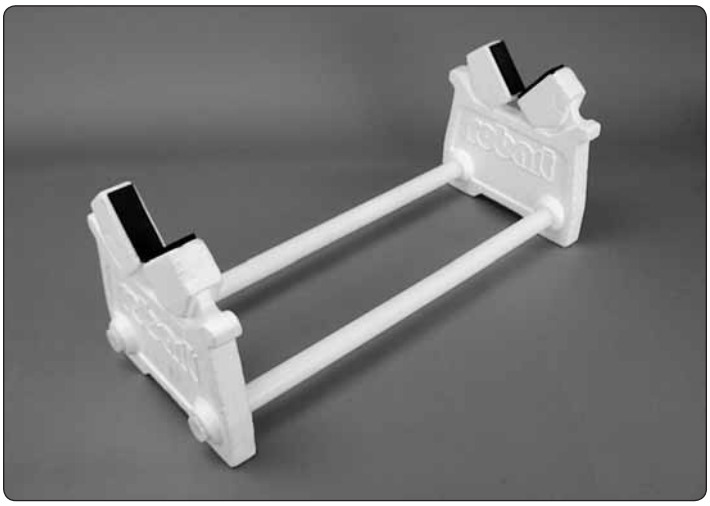
- ❍ 1/2 oz. [15g] Thin Pro CA (GPMR6001)
- ❍ Pro 6-minute or 30-minute epoxy (GPMR6045 or GPMR6047)
- ❍ Threadlocker thread locking cement (GPMR6060)
- ❍ Denatured alcohol (for epoxy clean up)
- ❍ Drill bits: 1/16" [1.6 mm], 5/64" [2 mm], 3/32" [2.4 mm], 1/8" [3.2 mm], 11/64" [4.4 mm]
- ❍ Rotary tool with cutting bit
- ❍ Great Planes Heat Shrink Tubing 3/8x3" (3) (GPMM1060)
- ❍ Revell Premium Soft Handle Knife w/Blades (5) (RMXR6900)
- ❍ Top Flite MonoKote sealing iron (TOPR2100)
- ❍ Top Flite Hot Sock iron cover (TOPR2175)
- ❍ Panel Line Pen (TOPQ2510)
- ❍ Hobbico Steel T-Pins 1" (100) (HCAR5100)
- ❍ Small clamps
- ❍ Masking tape
- ❍ Household oil

Optional Supplies and Tools

Here is a list of optional tools that will help you build the U-Can-Do SF ARF:

- ❍ 1/2 oz. [15g] Thick Pro CA- (GPMR6013)
- ❍ 1/2 oz. [15g] Medium Pro CA+ (GPMR6007)
- ❍ 2 oz. [57g] spray CA activator (GPMR6035)
- ❍ 4 oz. [113g] aerosol CA activator (GPMR6034)
- ❍ CA applicator tips (HCAR3780)
- ❍ CA debonder (GPMR6039)
- ❍ Epoxy brushes 6, (GPMR8060)
- ❍ Mixing sticks (GPMR8055)
- ❍ Mixing cups (GPMR8056)
- ❍ Pliers with wire cutter (HCAR0630)
- ❍ T.A. Emerald Performance Duster Compressed Air (TAEC1060)
- ❍ Servo horn drill (HCAR0698)
- ❍ Hobby Heat micro torch II (HCAR0755)
- ❍ Dead Center™ Engine Mount Hole Locator (GPMR8130)
- ❍ DuraTrax Ultimate Body Reamer (DTXR1157)
- ❍ Precision Magnetic Prop Balancer (TOPQ5700)
- ❍ AccuThrow Deflection Gauge (GPMR2405)
- ❍ CG Machine (GPMR2400)
- ❍ Hobbico Flexible 18" Ruler Stainless Steel (HCAR0460)
- ❍ Top Flite MonoKote trim seal iron (TOPR2200)
- ❍ Top Flite MonoKote heat gun (TOPR2000)
- ❍ Hobbico Pin Vise 1/16 Collet w/6 Bits (HCAR0696)
- ❍ Hobbico 8-Piece Ball Tip Hex L Wrench SAE (HCAR0520)
- ❍ Hobbico 7-Piece Ball Tip Hex L Wrench Metric (HCAR0521)
- ❍ Great Planes Clevis Installation Tool (GPMR8030)
- ❍ Great Planes Precision Prop Reamer Standard (GPMQ5006)
- ❍ Great Planes Precision Prop Reamer Metric (GPMQ5007)

Building Stand



A building stand or cradle comes in handy during the build. We use the Robart Super Stand II (ROBP1402) for all our projects in R&D, and it can be seen in pictures throughout this manual.

IMPORTANT BUILDING NOTES

- When you see the term ***test fit*** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or *custom fit* the part as necessary for the best fit.
- Whenever the term ***glue*** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will make a recommendation.
- Whenever just ***epoxy*** is specified you may use ***either*** 30-minute (or 45-minute) epoxy ***or*** 6-minute epoxy. When 30-minute epoxy is specified it is **highly** recommended that you use only 30-minute (or 45-minute) epoxy, because you will need the working time and/or the additional strength.
- **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.
- The stabilizer and wing incidences and engine thrust angles have been factory-built into this model. However, some technically-minded modelers may wish to check these measurements anyway. To view this information visit the web site at www.greatplanes.com and click on "Technical Data." Due to manufacturing tolerances which will have little or no effect on the way your model will fly, please expect slight deviations between your model and the published values.

KIT INSPECTION

Before starting to build, take an inventory of this kit to make sure it is complete, and inspect the parts to make sure they are of acceptable quality. If any parts are missing or are not of acceptable quality, or if you need assistance with assembly, contact **Product Support**. When reporting defective or missing parts, use the part names exactly as they are written in the Kit Contents list.

Great Planes Product Support
3002 N Apollo Drive, Suite 1 Ph: (217) 398-8970, ext. 5
Champaign, IL 61822 Fax: (217) 398-7721

E-mail: airsupport@greatplanes.com

ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes U-Can-Do SF are available using the order numbers in the **Replacement Parts List** that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company.

To locate a hobby dealer, visit the Hobbico web site at www.hobbico.com. Choose "Where to Buy" at the bottom of the menu on the left side of the page. Follow the instructions provided on the page to locate a U.S., Canadian or International dealer.

Parts may also be ordered directly from Hobby Services by calling (217) 398-0007, or via facsimile at (217) 398-7721, but full retail prices and shipping and handling charges will apply. Illinois and Nevada residents will also be charged sales tax. If ordering via fax, include a Visa or MasterCard number and expiration date for payment.

Mail parts orders and payments by personal check to:
Hobby Services
3002 N Apollo Drive, Suite 1
Champaign IL 61822

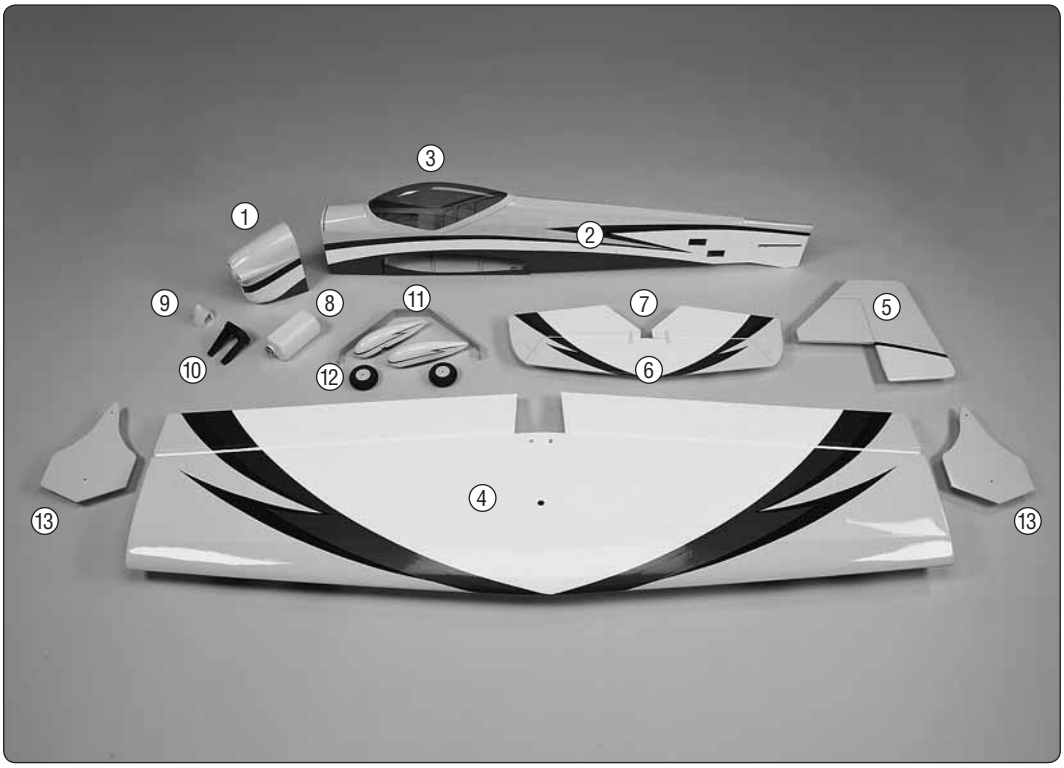
Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

If additional assistance is required for any reason contact Product Support by e-mail at productsupport@greatplanes.com, or by telephone at (217) 398-8970.

REPLACEMENT PARTS LIST

Order No.	Description
GPMA4335	Fuselage
GPMA4336	Wing / Ailerons
GPMA4337	Horizontal Stabilizer / Elevators
GPMA4338	Fin / Rudder
GPMA4339	Cowl
GPMA4340	Hatch
GPMA4341	Landing Gear
GPMA4342	Wheel Pants
GPMA4343	Spinner
GPMA4344	EP Motor Mount
GPMA4345	Side Force Plates
GPMA4346	Pushrods
GPMA4347	Tail Wheel Assembly

KIT CONTENTS

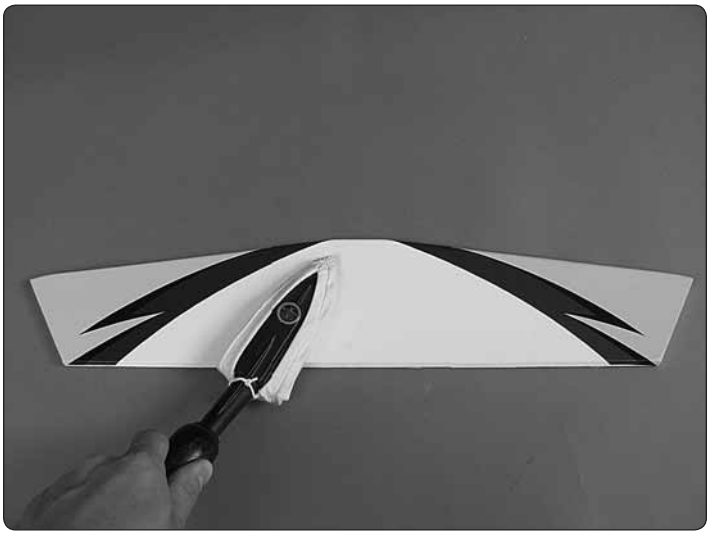


Kit Contents

1. Cowl
2. Fuselage
3. Canopy Hatch
4. Wing / Ailerons
5. Vertical Fin / Rudder
6. Horizontal Stabilizer
7. Elevator Halves
8. Fuel Tank
9. Spinner
10. Engine Mount
11. Landing Gear
12. Wheels
13. Side Force Generator

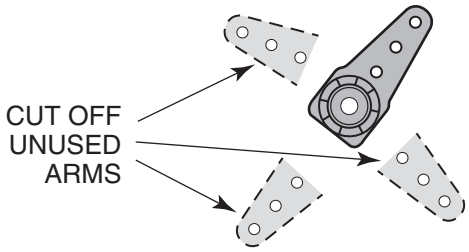
PREPARATIONS

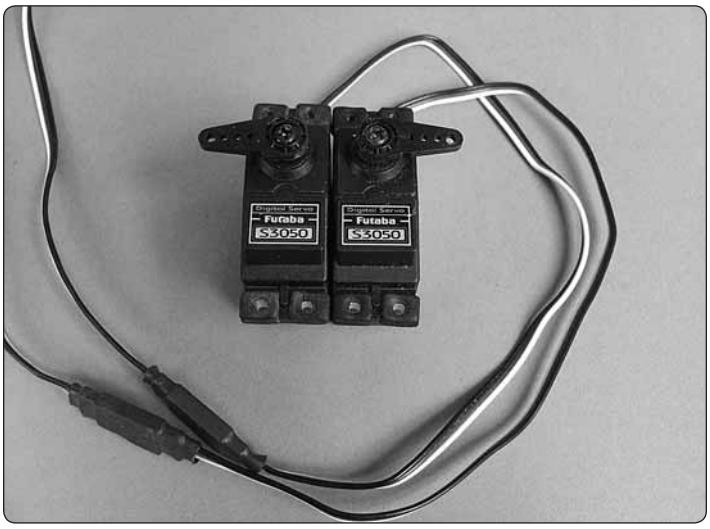
❏ 1. If you have not done so already, remove the major parts of the kit from the box and inspect for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the “Kit Inspection” section on page 5.



❏ 2. Remove the tape and separate all the control surfaces. Use a covering iron with a covering sock on high heat to tighten the covering if necessary. Apply pressure over sheeted areas to **thoroughly** bond the covering to the wood.

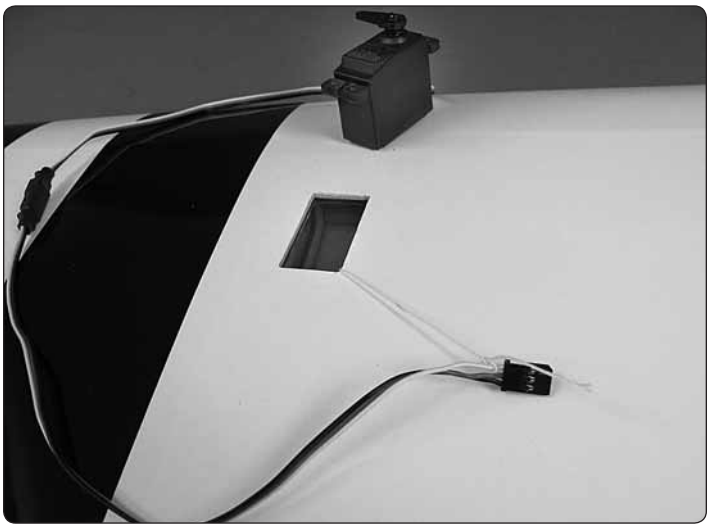
INSTALL THE AILERON SERVOS, PUSHRODS AND BELLY PAN



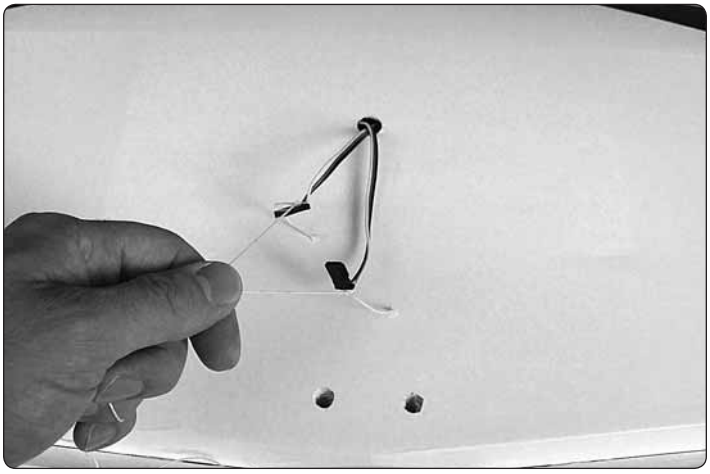


❏ 1. Center your aileron servos with your radio system. Test fit four-armed servo arms onto the servos to determine their best orientation so that the arms are closest to being

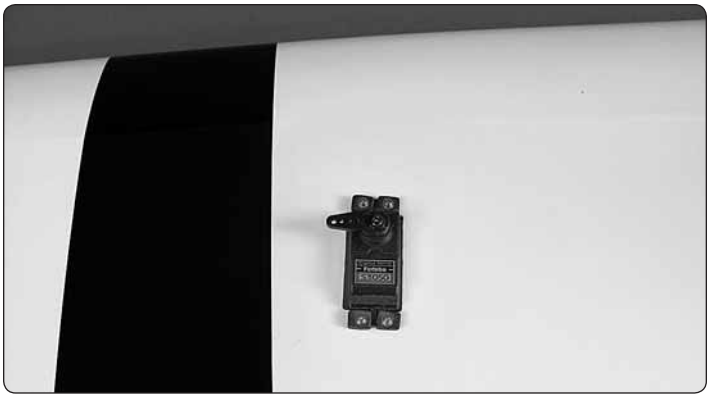
perpendicular with the servo case. Cut three arms from each servo arm leaving one arm on each servo that matches the photo. Enlarge the outer hole of each remaining arm with a 5/64" [2mm] drill bit. Attach a 12" [305mm] servo extension to each servo. Secure the connection using tape, heat shrink tubing (not included) or special clips designed for that purpose. Install the rubber grommets and eyelets onto the servo mounting tabs.



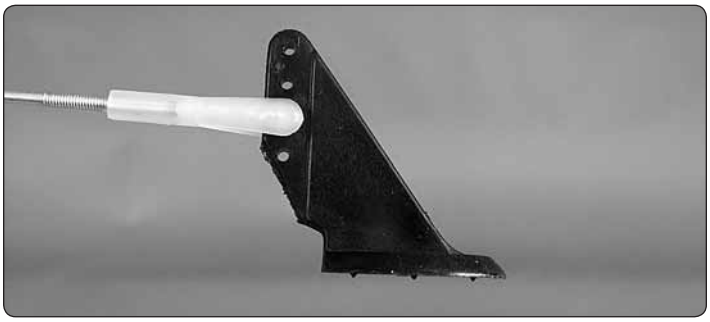
❏ 2. Tie the string ends that are taped inside the wings at the aileron servo bays to the servo extension connectors.



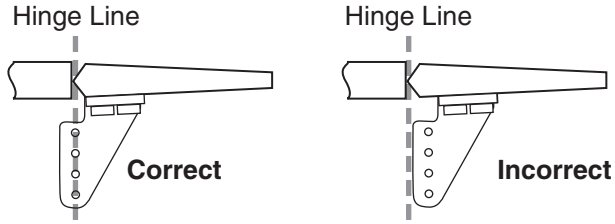
❏ 3. Reach into the hole in the center of the top of the wing with slender needle nose pliers and grab the string. Pull the string through the hole. Use the string to pull the servo leads through the wing and out the hole.

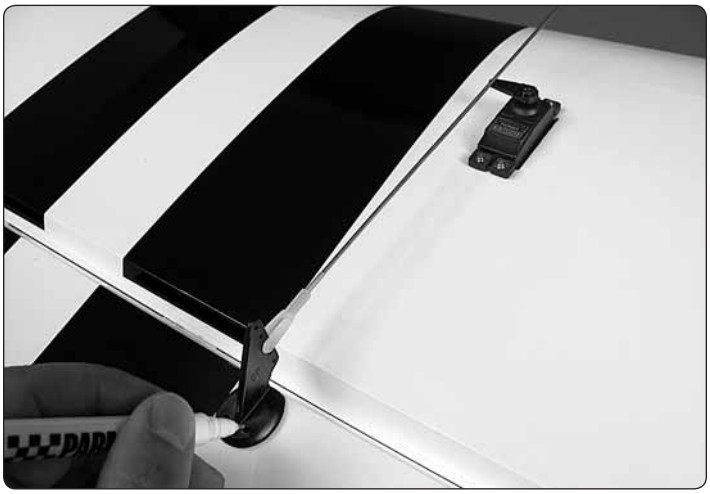


❏ 4. Fit the servos into the servo openings and drill 1/16" [1.6mm] holes through the mounting tabs on the servo cases into the rails. Thread a servo mounting screw (included with the servo) into each hole and back it out. Apply a drop of thin CA to each hole to harden the surrounding wood. When the CA has dried, install the servos into the openings as shown using the screws supplied with the servos.



❏ 5. Thread a nylon clevis onto two 12" [305 mm] pushrods 20 complete turns. Attach each clevis to the middle hole of a large control horn. Cut off the bottom corner of each control horn.

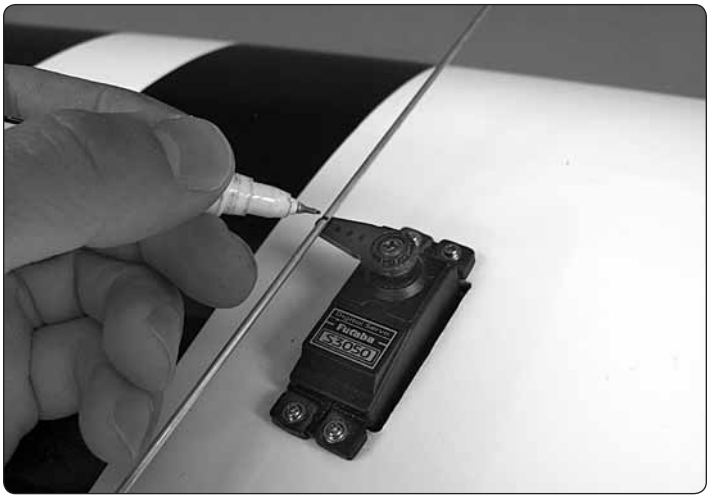




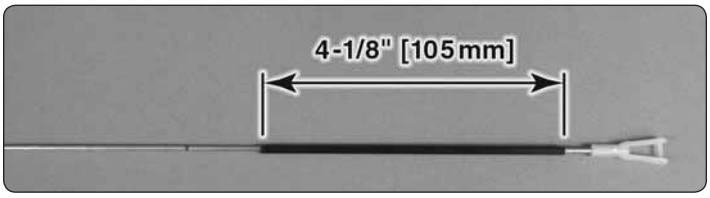
❏ 6. Position a control horn onto the aileron aligning the pushrod with the outer hole of the aileron servo arm. Position

the control horns over the hardwood blocks in the ailerons (if you cannot see them, hold the aileron at a shallow angle in good lighting or use a small pin to puncture the covering). When satisfied, use a felt-tip pen to mark the location of the control horn mounting holes onto the aileron. Repeat this step for the other aileron.

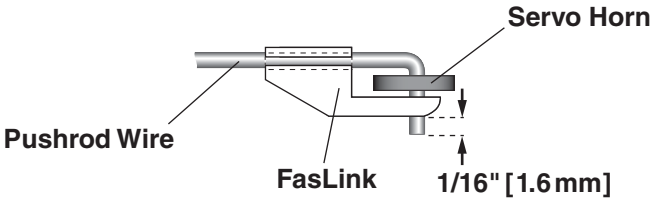
❏ 7. Drill 5/64" [2mm] holes at the marks you made. Thread a #4 x 5/8" [16mm] self-tapping screw into each hole and back it out. Apply a drop of thin CA to each hole to harden the surrounding wood. Install the control horns onto the ailerons using eight #4 x 5/8" [16mm] screws.

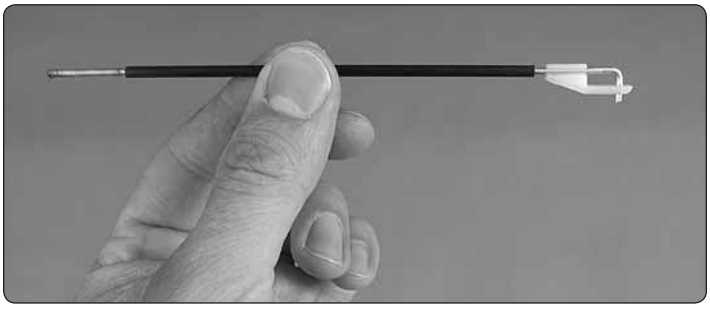


❏ 8. With the ailerons in the neutral position (use tape or small clamps to hold them in place), mark the pushrod wires where they cross the outer holes in the servo arms.

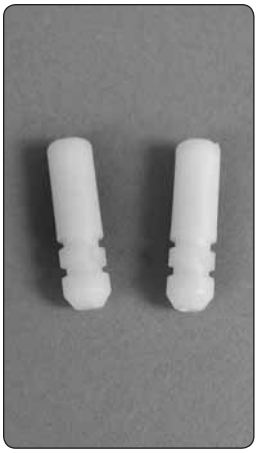


❏ 9. Clean the area of the pushrods between the marks you made and the threads with a paper towel dampened with denatured alcohol. Apply a thin coating of epoxy onto the pushrods from the end of the threads to approximately 3/4" [19mm] from your marks. Slide the two 4-1/8" [105mm] carbon tubes over the pushrods up to the pushrod threads. Wipe away any excess epoxy with denatured alcohol and allow the epoxy to cure undisturbed.

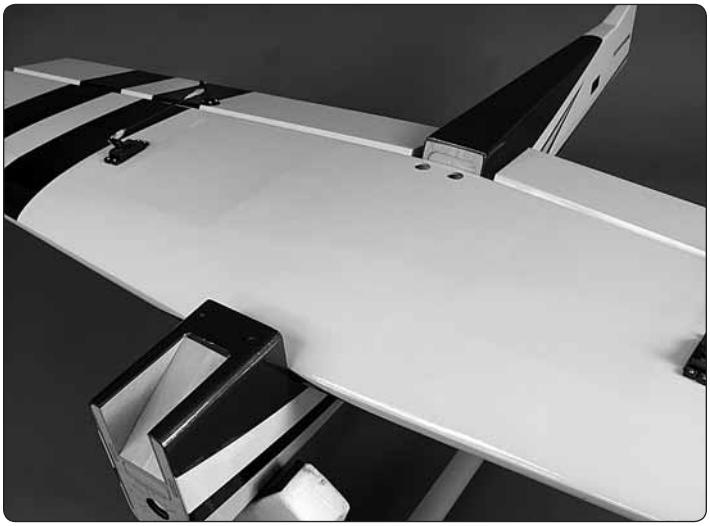


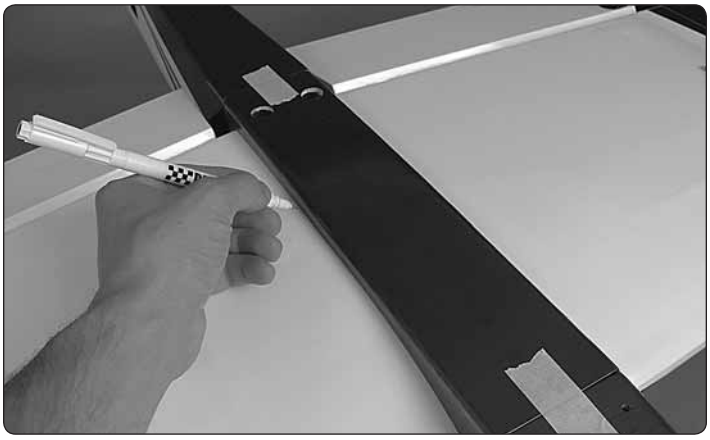


❏ 10. Make a 90 degree bend at the mark on each pushrod and cut off the excess pushrod 1/4" [6mm] ends beyond the bends. Attach the pushrods to the servo arms using nylon FasLinks. Thread the clevises up or down on the pushrods as necessary to center the ailerons with the servo arms still perpendicular to the servo cases. When satisfied, slide silicone clevis retainers onto the ends of the clevises to secure them.



❏ 11. Locate the two nylon wing dowels. Coat the grooved ends with epoxy and fit the dowels into the holes at the leading edge of the wing as far as they will fit into the holes. Wipe away any excess epoxy with denatured alcohol.



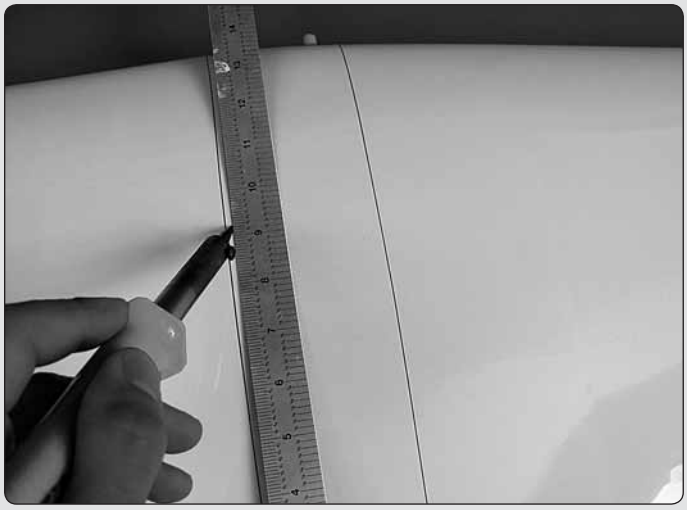


❏ 12. Mount the wing onto the fuselage using two 1/4-20 nylon wing bolts. Fit the belly pan onto the underside of the wing, align it with the fuselage and temporarily tape it into place. Use a felt-tip pen to trace around the belly pan onto the wing.

❏ 13. Remove the covering between the lines you drew.

HOW TO CUT COVERING FROM BALSA

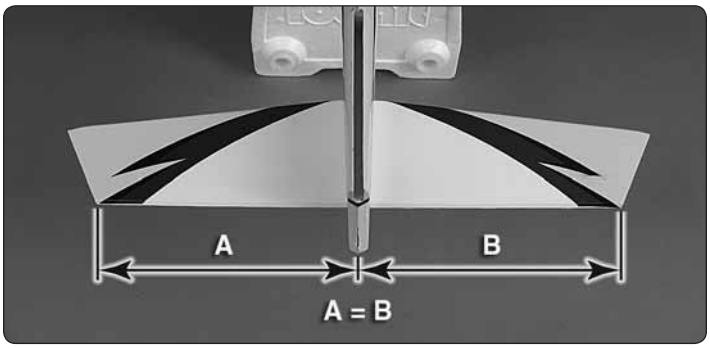
Use a soldering iron to cut the covering from the stab. The tip of the soldering iron doesn't have to be sharp, but a fine tip does work best. Allow the iron to heat fully.

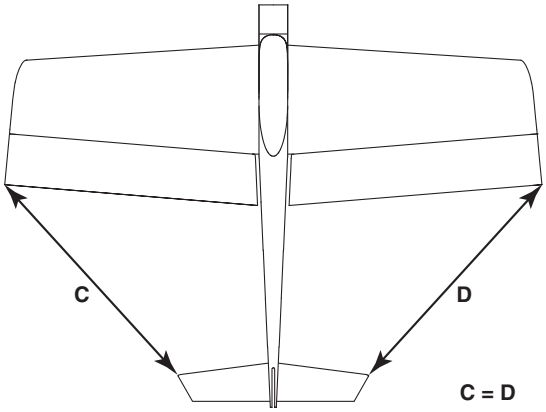


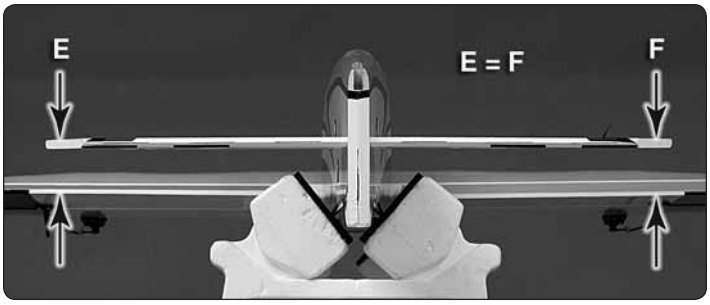
Use a straightedge to guide the soldering iron at a rate that will just melt the covering and not burn into the wood. The hotter the soldering iron, the faster it must travel to melt a fine cut. Peel off the covering.

❏ 14. Use epoxy to glue the belly pan to the wing. Take care not to glue the belly pan to the fuselage. It is recommended to separate the forward and aft ends of the belly pan and fuselage with wax paper before gluing it in place.

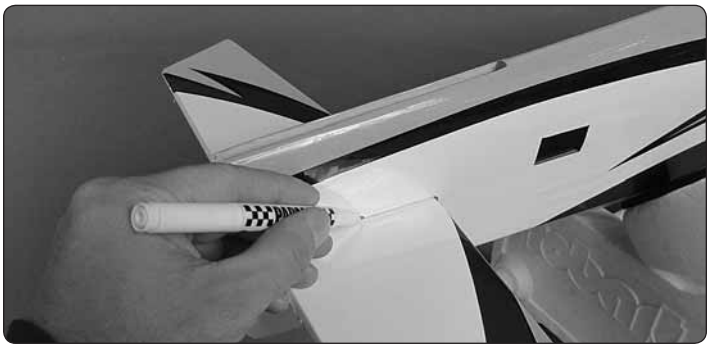
INSTALL THE TAIL SECTION



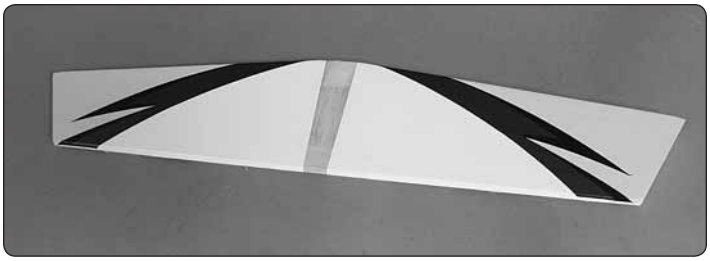




❏ 1. Insert the horizontal stabilizer into the stabilizer slot and center it left and right. Align the stab so the distance between the wing tips and stab tips are equal on both sides. Now, with the wing still in place, stand behind the model approximately 10 feet [3m] and confirm that the stab sits parallel with the wing. If not, weight can be added to to the high side while gluing the stab in place, or the stab pocket can be lightly sanded until the stab and wing sit parallel.

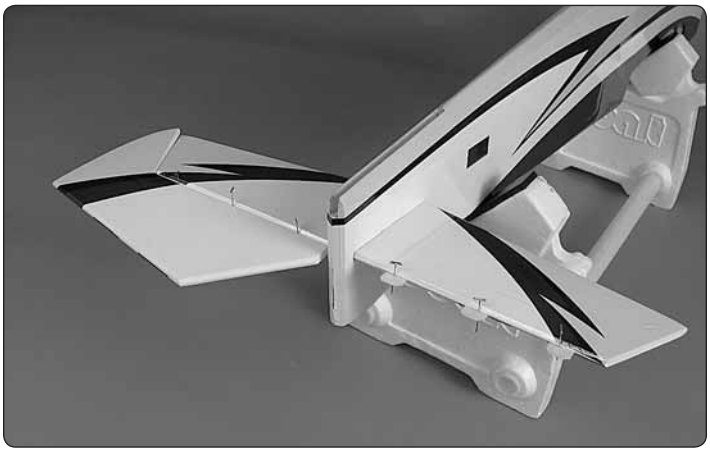


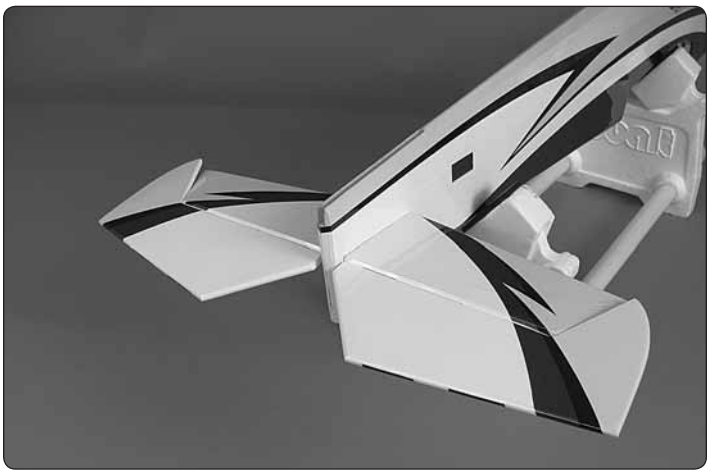
❏ 2. With the stab carefully aligned from the previous step, use a fine felt-tip pen to trace the outline of the fuselage onto the stab. Mark the top and bottom of the stab.



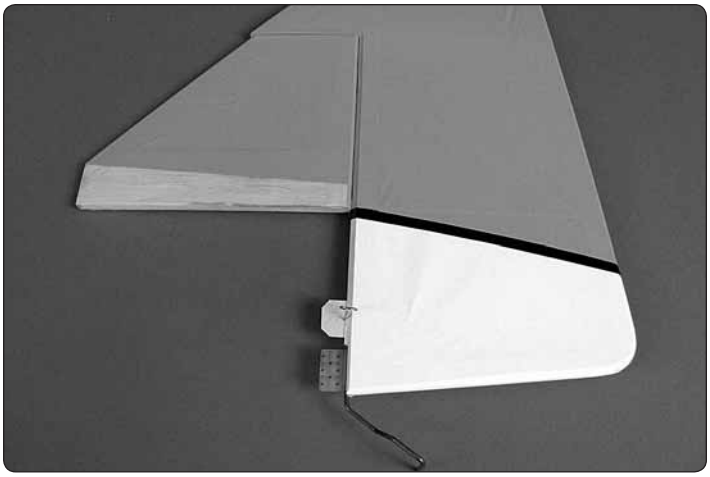
Pull the stab from the fuselage and remove the covering 1/16" [1.6mm] inside your lines using the same technique you used on the wing.

❏ 3. Coat the exposed wood with 30-minute epoxy (although messy, a more reliable glue joint can be attained if you also coat the inside edges of the stab pocket). Reinstall the stab and properly position it in the pocket. Wipe away any excess epoxy with denatured alcohol and let the epoxy cure undisturbed. When cured, the wing can be removed from the fuselage and set aside as it will not be needed until the final set up of the plane.

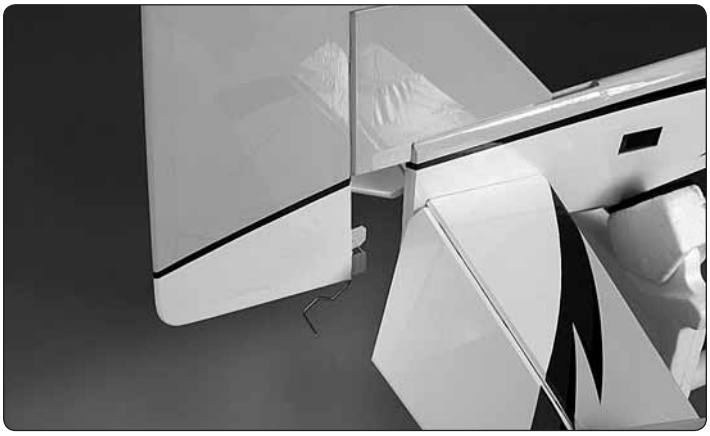




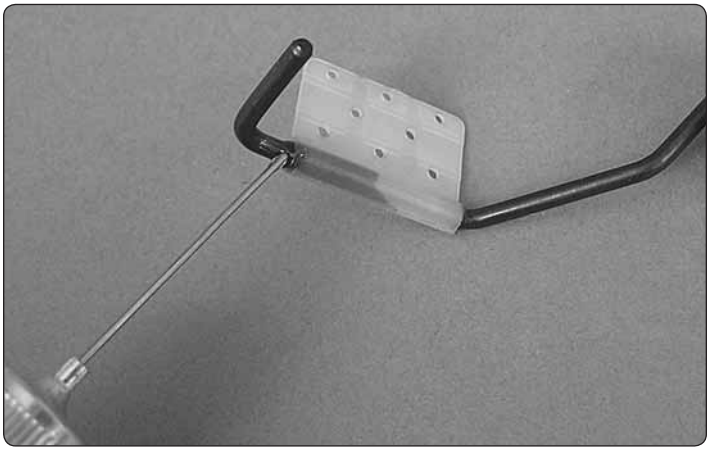
❏ 4. Stick a T-pin or something simliar through the center of six CA hinges. Insert the hinges into the slots in the trailing edge of the stab up to the pins. Install the elevator halves onto the other ends of the hinges. Allow approximately 3/32" [2.4mm] gap between the ends of the stab and the elevators. Pull the pins out, deflect the elevator halves down and apply 6 to 7 drops of thin CA glue to the center of each hinge. Flip the plane over and apply another 6 or 7 drops to the undersides of the hinges. When the CA glue has dried, pull on each elevator half to confirm they are thoroughly glued in place.



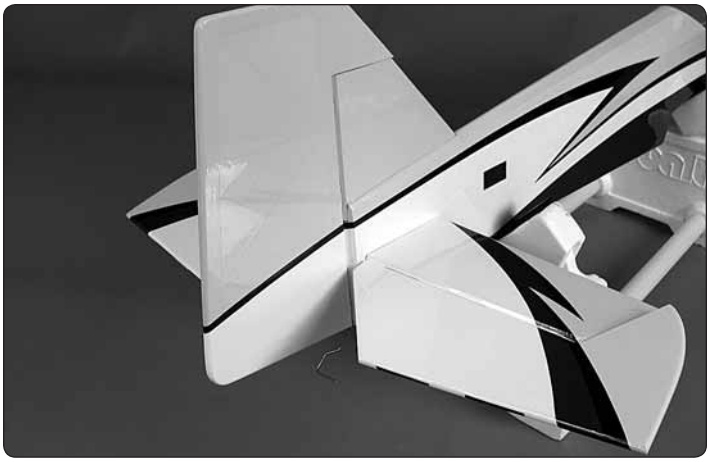
❏ 5. Temporarily install the vertical fin and rudder into the slot in the fuselage. Trace around the fuselage onto the fin and remove the covering just below your lines. Stick a T-pin through the remaining CA hinge and insert the hinge into the slot in the rudder. Test fit the tail wheel wire into the rudder.



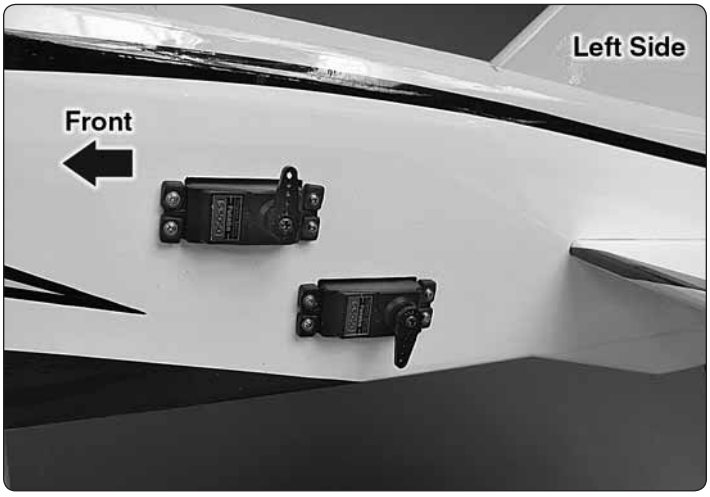
❏ 6. Test fit the vertical fin into the slot in the fuselage. Fit the CA hinge into the slot in the fuselage and the nylon tab on the tail wheel wire into the slot below the CA hinge slot. Make any adjustments to the slots to ensure the vertical fin and rudder fit properly against the aft end of the fuse.

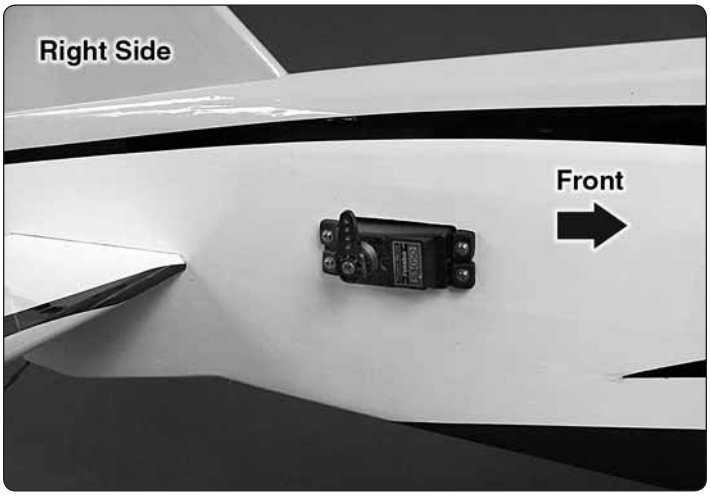


❏ 7. When satisfied with the fit, remove the fin and rudder. Remove the tail wheel wire from the rudder and clean the rudder end of the wire with denatured alcohol. Apply a few drops of oil along the hinge of the nylon tab.

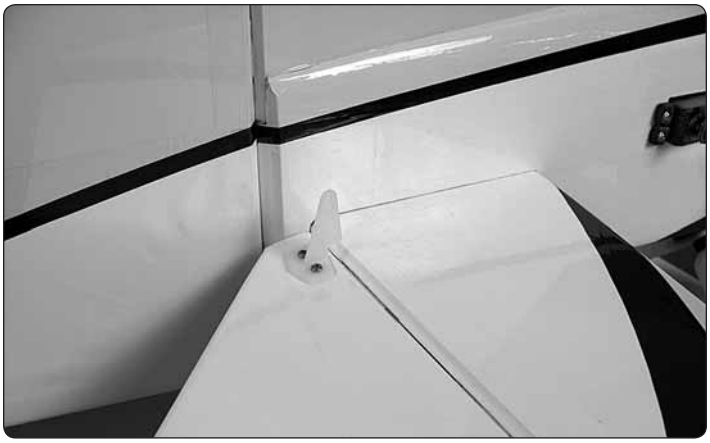


Coat the inside of the fin slot with epoxy as well as the rudder end of the tail wheel wire and the nylon tab. Fit the vertical fin back into place in the fuselage and the CA hinge and tail wheel tab back into the slots. Wipe away any excess epoxy with denatured alcohol. Apply 6 or 7 drops of thin CA to each side of the rudder hinge. Allow the epoxy to cure undisturbed.



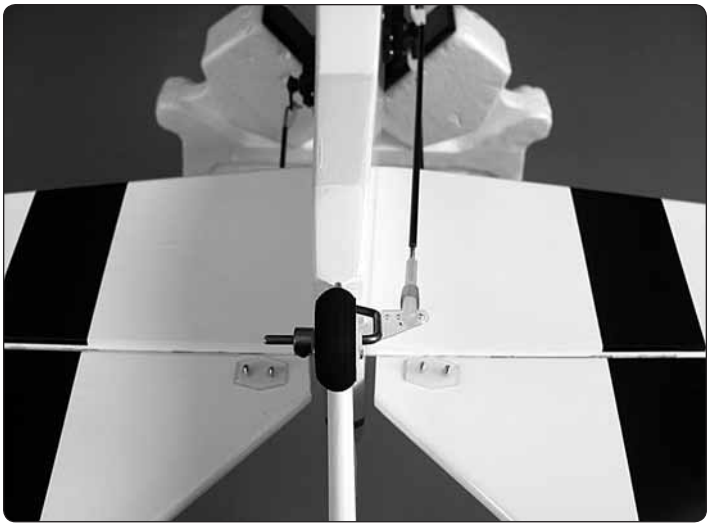


❏ 8. Attach 24" [610mm] servo extensions onto the two elevator servos and the rudder servo. Be sure to secure the extensions as you did with the aileron servos. Center the servos with your radio system and install servo arms in the orientations shown in the pictures. Use the hardware included with the servos to mount them in the tail of the fuselage. Thin CA glue should be applied to each of the servo screw holes.



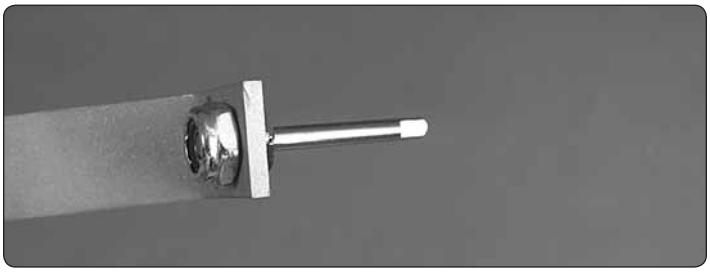
❏ 9. Locate the mounting blocks under the covering in the elevator halves for the elevator control horns. Position a control horn onto each elevator half over these mounting blocks and mark the locations for the control horn mounting screws. Drill 5/64" [2mm] holes at your marks. Install the control horns using four 2-56 x 5/8" [16mm] machine screws and control horn backplates.

❏ 10. The procedure for making the elevator pushrods is the same as it was for the ailerons. A 5-5/16" [135mm] and a 7-1/16" [180mm] carbon tube are included for strengthening the elevator pushrods. The clevises should be connected to the fourth outer holes from the control horn bases. Assemble and install the rudder pushrod in the same manner using the remaining 5-7/8" [150mm] carbon tube.

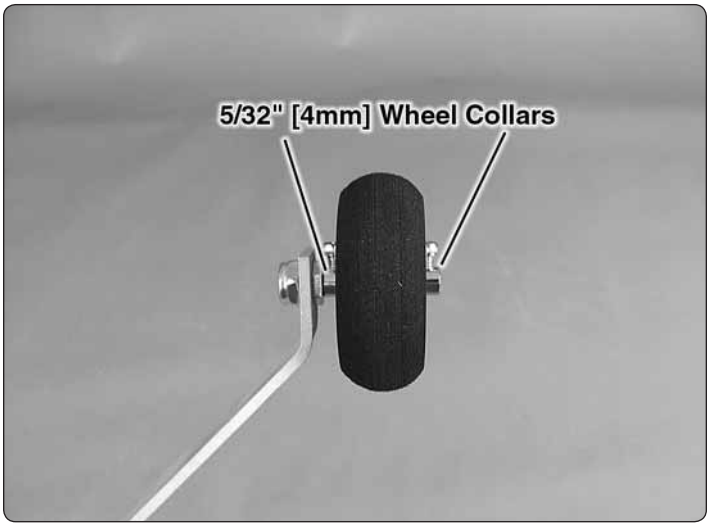


❏ 11. Apply a drop or two of oil onto the tail wheel axle and slide on the tail wheel. Secure it in place with a 1/8" [3.2mm] wheel collar and 4-40 set screw. Confirm that the tail wheel rotates freely.

INSTALL THE MAIN LANDING GEAR



❏ 1. Install the axles onto the main landing gear legs using the large axle nuts. Orient them so the flat spots at the ends of the axles are facing downward.



❏ 2. Slide a 5/32" [4mm] wheel collar onto the axle and tighten it against the base of the axle using a 6-32 x 1/4" [6mm] socket head cap screw and thread locking compound. Apply a drop or two of oil to the axle and then install a main wheel. Install another 5/32" [4mm] wheel collar and 6-32 x 1/4" [6mm] SHCS onto the axle against the flat spot. Confirm that the wheel rotates freely. Repeat this step for the other axle.

❏ 3. Install the wheel pants onto the landing gear using four 2-56 x 1/2" [13mm] machine screws, four #2 lock washers, four #2 flat washers and thread locking compound. The angled edge of the landing gear legs is the AFT edge.

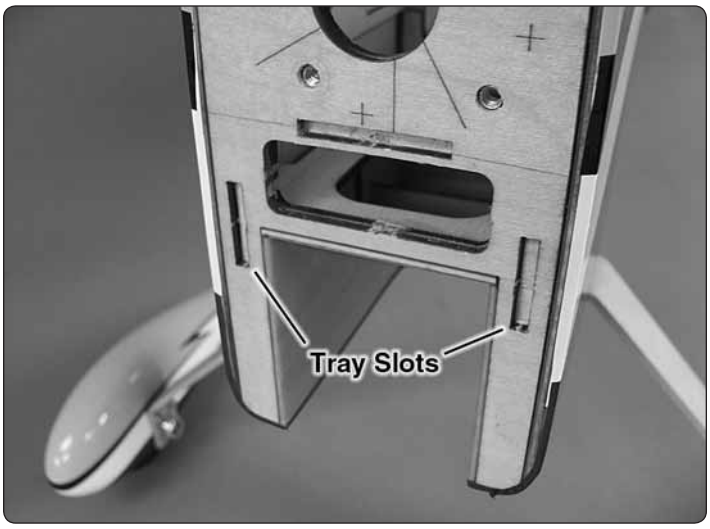
❏ 4. Attach the gear to the fuselage using two 6-32 x 3/4" [19mm] machine screws, two #6 lock washers, two #6 flat washers and thread locking compound.

INSTALL THE POWER SYSTEM

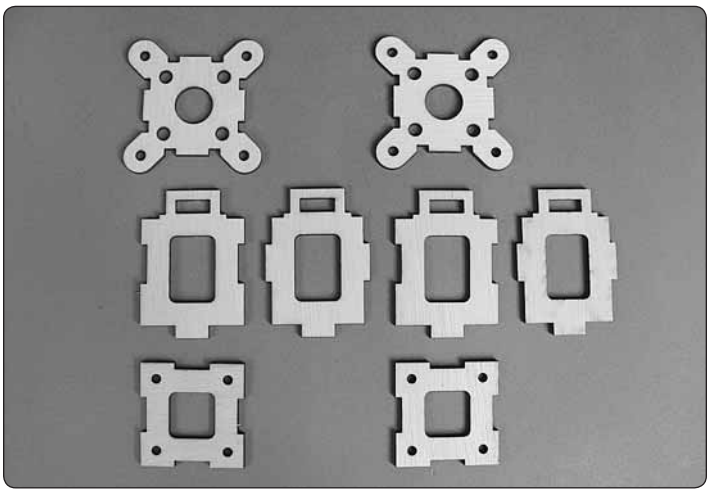
Brushless Motor

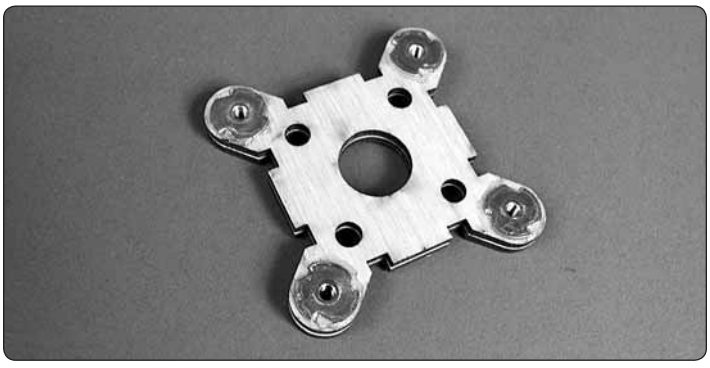
This section only contains information relating to the installation of a brushless power system. Skip this section if you plan to install a glow engine.

❏ 1. Drill four 11/64" [4.4mm] holes at the marks on the firewall for the brushless motor mount. Note that there are two sets of marks. Be sure to drill the holes as shown in the picture. It is recommended to start with a small drill bit and work your way up in size to 11/64" [4.4mm]. Doing this will improve accuracy in the positioning of the holes and will reduce the amount of tear-out from the backside of the holes. When completed, install 6-32 blind nuts into the holes. Draw them fully into the holes by threading a 6-32 x 5/8" [15.9mm] screw and #6 flat washer into each hole and tightening the screw.



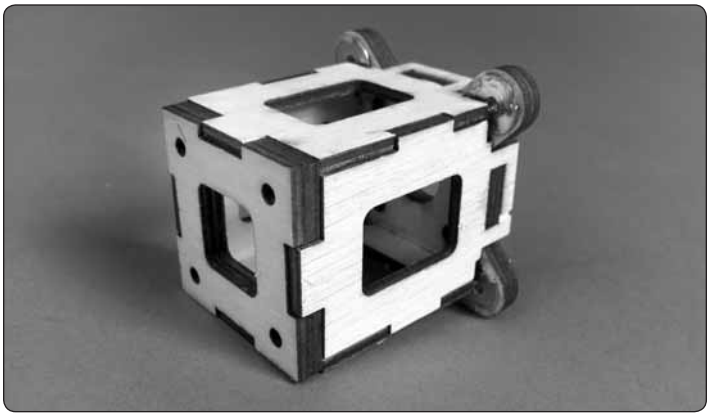
❏ 2. Use a sharp hobby knife to finish cutting out the ESC tray slots and the cooling hole. Note that the firewall is made up of two layers of plywood. The cooling hole is removed from both layers. The three slots are removed from only one layer.



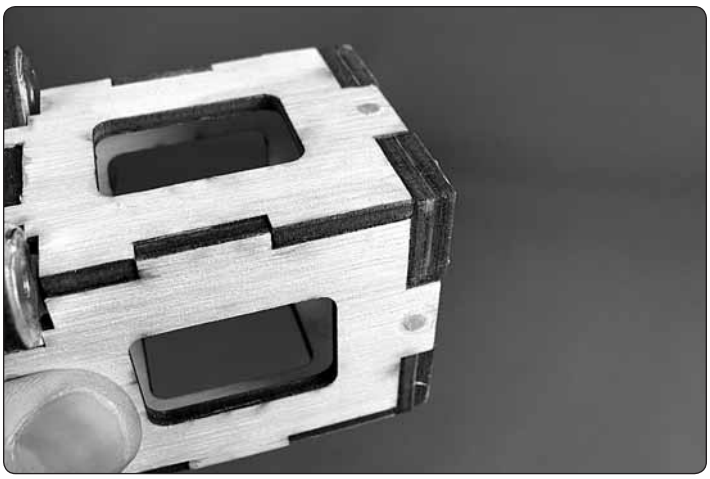


❏ 3. Locate the pieces that make up the brushless motor mount. Begin the assembly by gluing the two front pieces together, making sure that the edges are flush with each other.

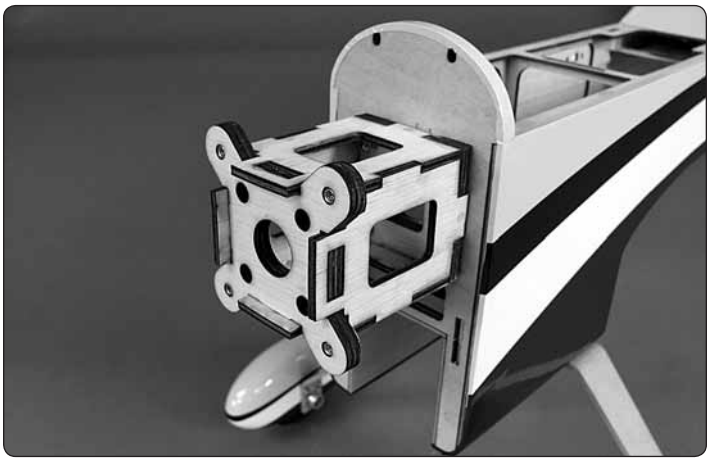
Press four 6-32 blind nuts into the holes as shown and apply some glue around each nut to prevent them from coming loose.



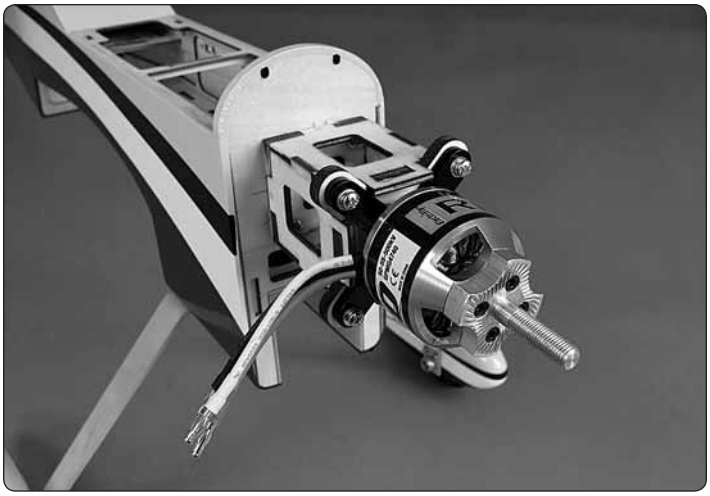
❏ 4. Glue the two rear pieces together. Assemble the rest of the mount being sure to **thoroughly** glue all the joints together. We suggest using thin CA on all the outside joints and then running a bead of medium or thick CA along all the inside joints.



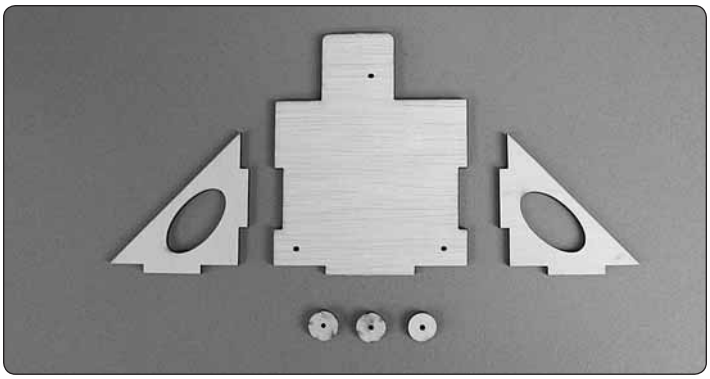
❏ 5. A short length of 1/8" [3.2mm] wood dowel is included. Cut four 1/2" [13mm] pieces from the dowel. Drill 1/8" [3.2mm] holes approximately 3/8" [9.5mm] deep into the center of each forward tab. Glue a piece of dowel into each hole and sand them flush with the sides of the motor mount.

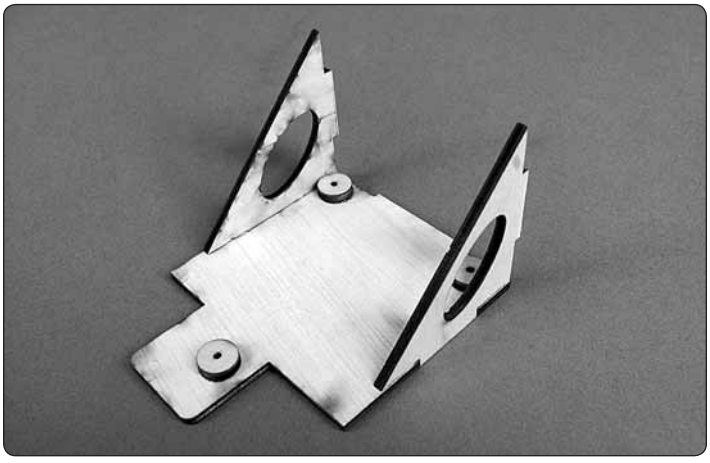


❏ 6. Attach the brushless motor mount to the firewall using four 6-32 x 3/4" [19mm] machine screws, four #6 flat washers, four #6 lock washers, and thread locking compound.



❏ 7. Install the aluminum 'X' mount and prop adapter onto your brushless motor using the screws included with the motor and thread locking compound. Attach the motor onto the front of the brushless motor mount using four 6-32 x 5/8" [15.9mm] machine screws, four #6 flat washers, four #6 lock washers, and thread locking compound.

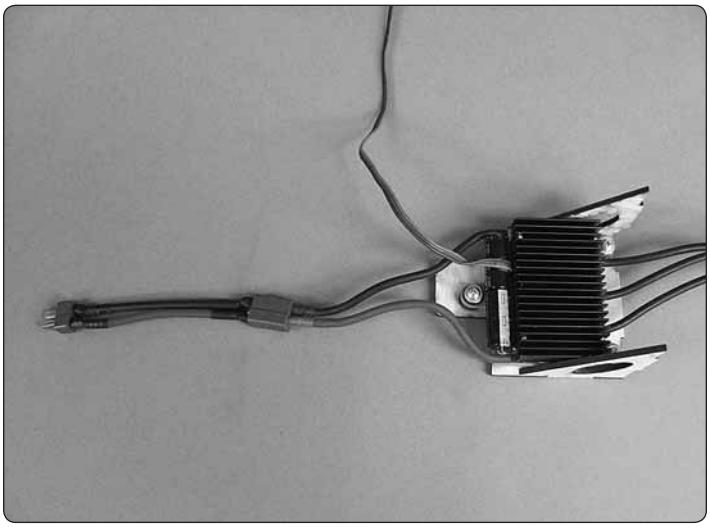




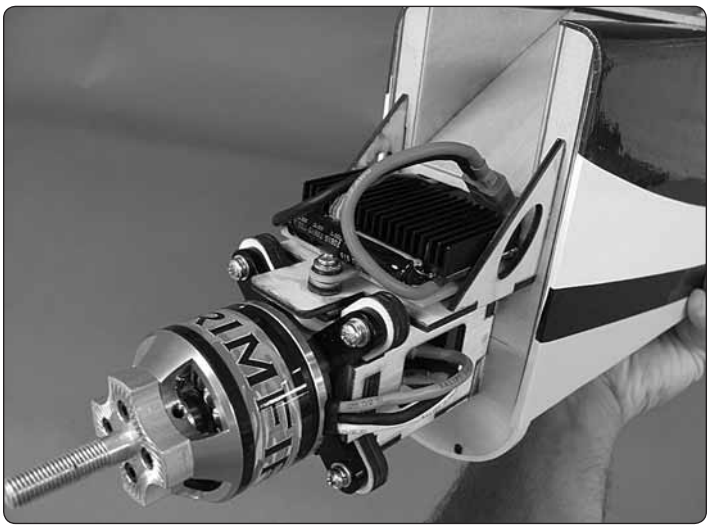
❏ 8. Locate the six plywood pieces that make up the ESC tray. Glue them together as shown.

❏ 9. It is recommended to make a 3" [76mm] battery lead extension to make connecting your pack easier. In order to

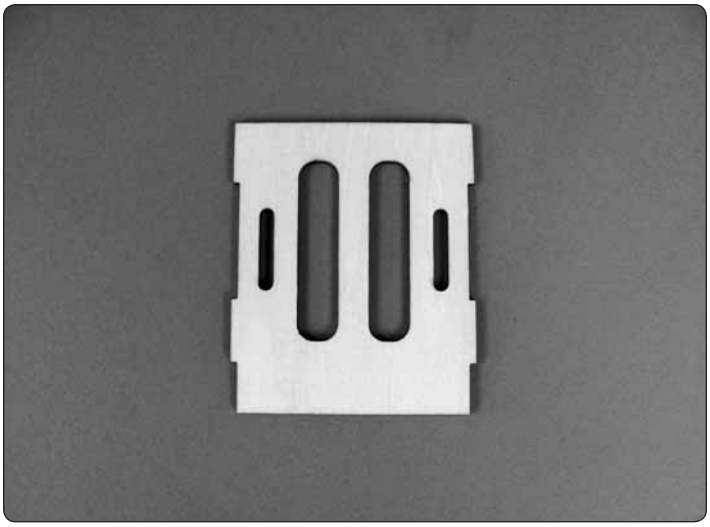
make the extension shown you will need to purchase: W.S. Deans® Female Ultra Plug® w/Pigtail (WSDM3010) and W.S. Deans® Male Ultra Plug® (2) (WSDM1302). To make the extension, cut the wires on the pigtail to a length of 3" [76mm] and strip the insulation 3/16" [4.8mm] from the end of the wires. Slide pieces of heat shrink tubing onto the wires and solder the wires onto the male connector.

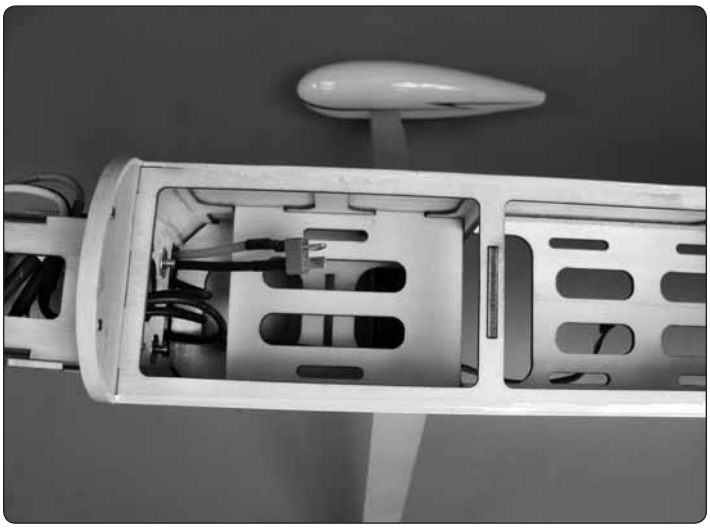


❏ 10. Connect your battery lead extension to the ESC. Mount the ESC to the ESC tray with three #4 x 1/2" [13mm] self-tapping screws and three #4 flat washers. If you are using an ESC other than the one recommended, you may need to modify the tray or mount the ESC in a different manner.

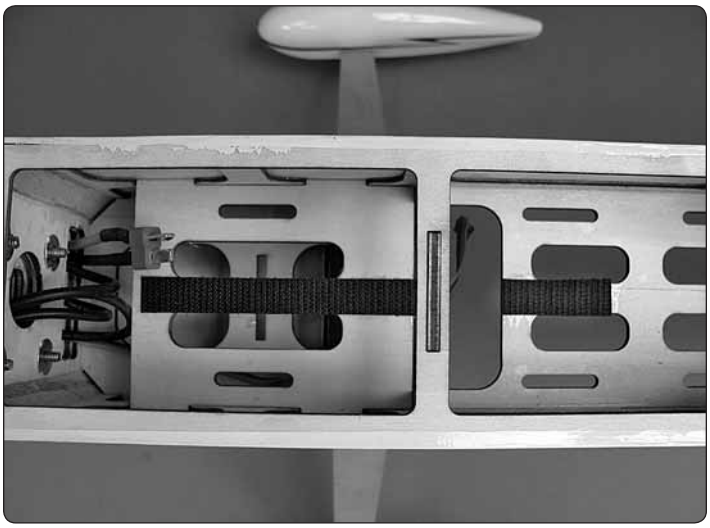


❏ 11. Connect the motor wires to the ESC, route the battery lead and receiver lead through the cooling hole in the firewall and thoroughly glue the ESC tray into the slots in the firewall.

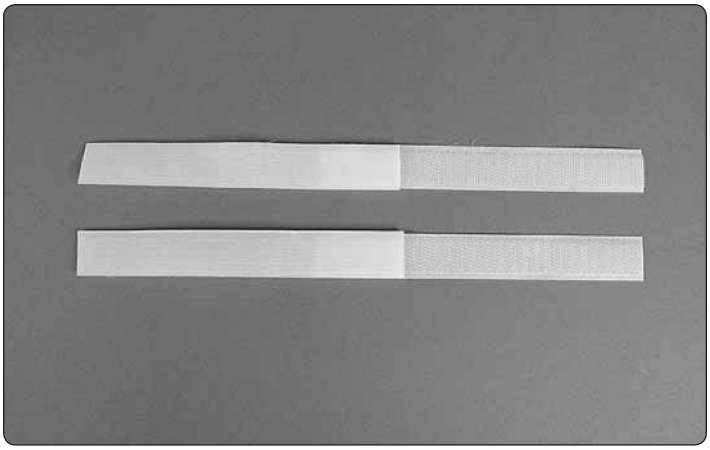




❏ 12. Glue the battery tray in the location shown. When the glue has hardened, pull on the tray to confirm it has been securely glued in place.



❏ 13. Apply a coating of epoxy down the center of the battery tray and allow it to cure completely. Cut pieces from the hook side of the included self-adhesive hook and loop material and apply them over the epoxy as shown.

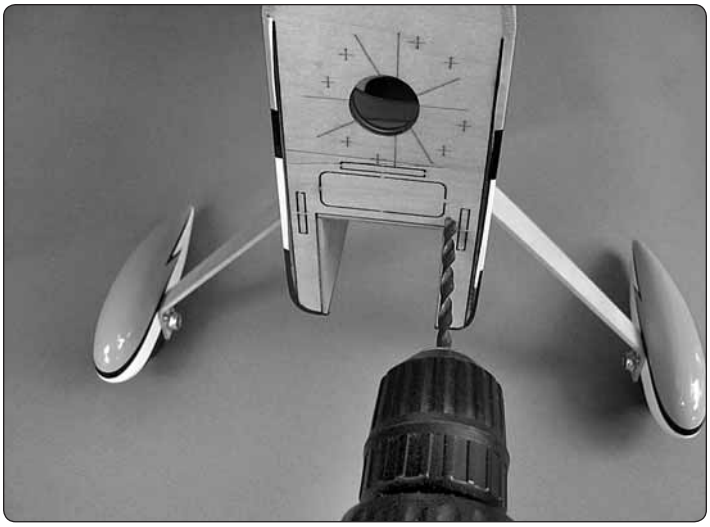


❏ 14. Make 6" [152mm] battery straps by cutting pieces from the included non-adhesive hook and loop material and overlapping the mating ends by 1" [25.4mm]. Feed the straps through the slots shown in the photo.

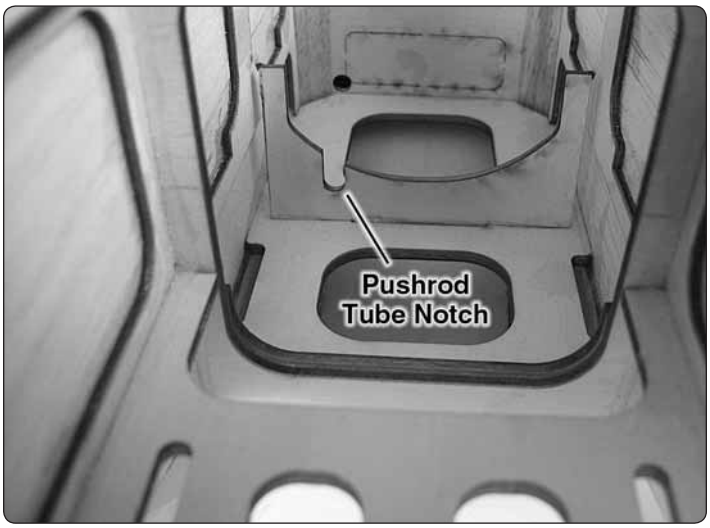
Glow Engine

The following section only contains information relevant to installing a glow engine. If you have already installed a brushless motor then skip this section. The O.S. .65 AX engine is shown in this section with the stock muffler. Other model engines will install in a similar manner. If your throttle arm is in a different position than what is shown in the photos then you will need to adjust the location of the throttle pushrod accordingly.

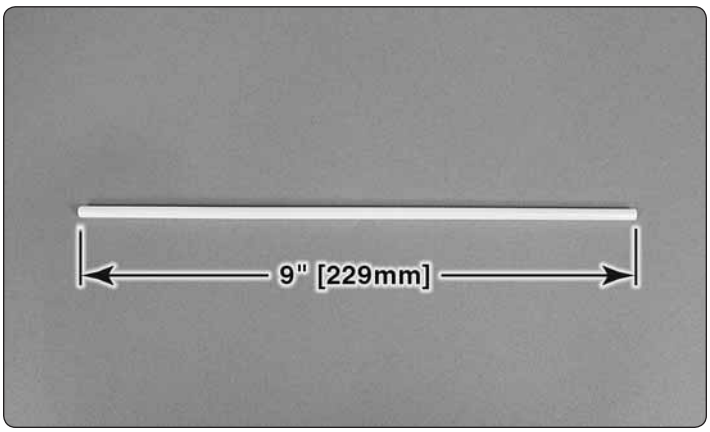
This section shows the stock muffler being used and therefore the angled engine mount pattern was chosen to align the muffler in the cavity on the bottom of the fuselage. If you plan to use a 4-stroke engine or a Pitts style muffler, then you can use the engine mount pattern that has the center lines running horizontally and vertically depending on the engine model. A .55AX O.S. engine stock muffler will fit in the cavity without the need to cut away the bottom of the cowl. The .65AX stock muffler will also fit in the cavity; however, the majority of the bottom of the cowl will need to be cut away because the muffler will protrude slightly lower than the bottom line of the fuselage. The .65AX can also be mounted inverted with the muffler located on the side of the fuselage (not shown). Choose the engine orientation that works for you before proceeding.



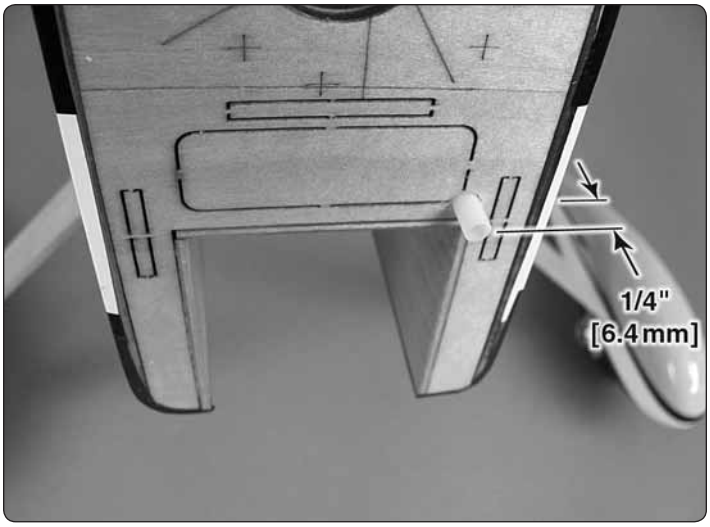
❏ 1. If you are mounting a .55AX or .65AX engine in the angled orientation, drill a hole for the throttle pushrod in the firewall in the location shown using an 11/64" [4.4 mm] drill bit. If you are installing a different engine or an inverted engine, you will need to locate this hole according to the position of the throttle arm on your carburetor. Be sure you are clearing the fuel tank area when drilling the hole.

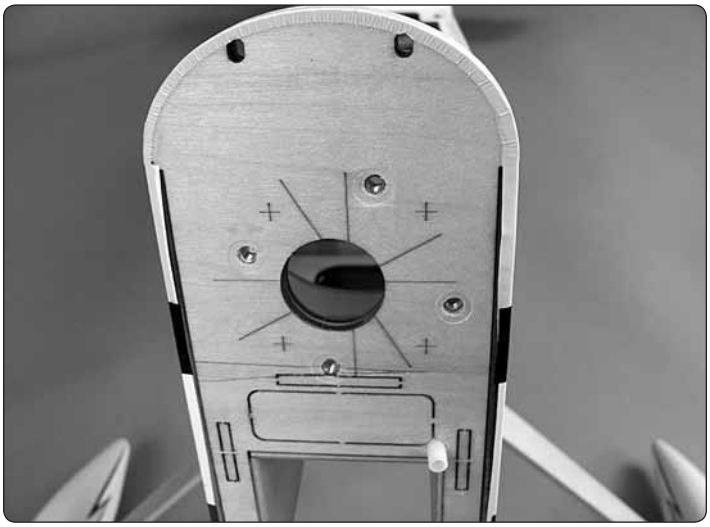


❏ 2. Glue the fuel tank support in place. Be sure the notch for the throttle pushrod tube aligns with the hole you drilled in the previous step.

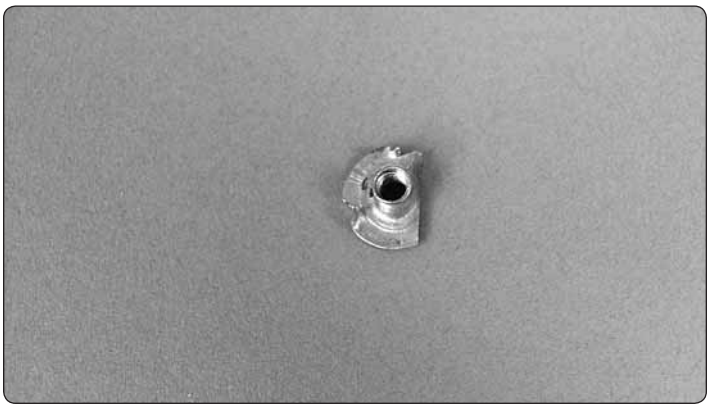


❏ 3. Cut the included outer pushrod tube to 9" [229 mm].



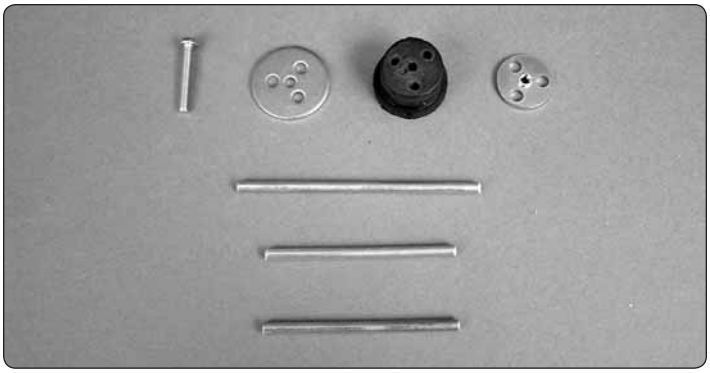


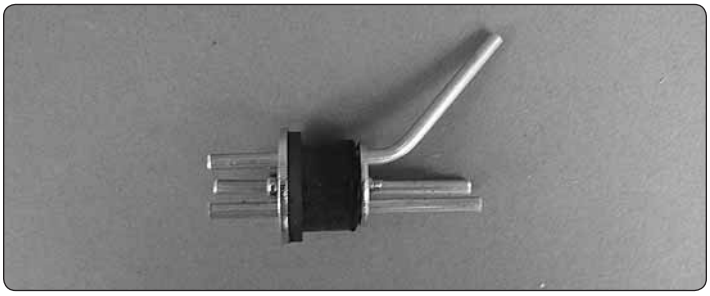
❏ 4. Insert the pushrod tube through the hole you drilled in the firewall and into the notch in the fuel tank support. The pushrod tube should stick out past the firewall approximately 1/4" [6.4mm]. Glue the tube to the firewall and into the notch with CA glue. If you have positioned the pushrod in a location different than what is shown in the picture, you may need to modify the fuel tank support to accommodate the pushrod tube. With glue in hand, fill the perforated cutout lines for the cooling hole and ESC tray slots in the firewall. These cutouts are for the brushless installation only and should be glued in place for a glow engine setup.



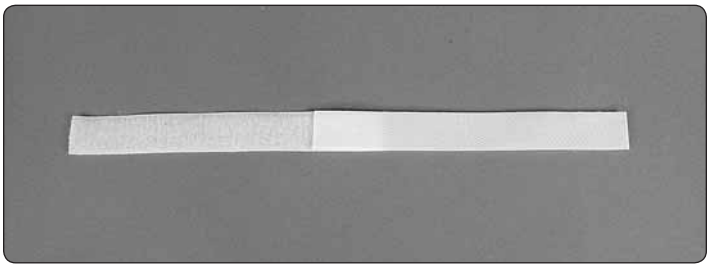
❏ 5. Grind or cut off a portion of one of the 6-32 blind nuts as shown.

❏ 6. Drill 11/64" [4.4mm] holes at the angled mounting pattern on the firewall. For accuracy and to avoid tearing the wood we suggest starting with a 1/16" [1.6mm] bit and working up in bit size. Install four 6-32 blind nuts using a 6-32 x 3/4" [19mm] machine screw and a #6 flat washer to draw them tight into the holes. The blind nut that you cut in step 5 should go in the top hole.



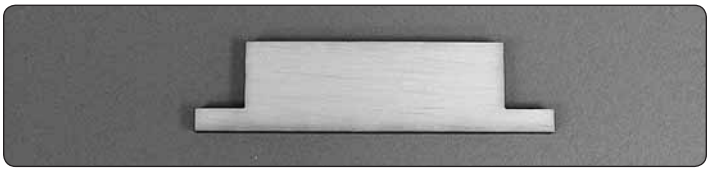


❏ 7. The fuel tank can be assembled as a two line system consisting of a vent (pressure) line to the muffler and a carb line. Filling and emptying of the tank would need to be done through the carb line, or an optional fuel fill valve (not included). The tank can also be assembled as a three line system (shown) having a vent line, carb line, and fill line. If installing a fill line, puncture the top of the stopper above the sealed off fuel tube hole. The fill and carb lines should extend out 1/2" [13mm] beyond the stopper and the vent line should be bent upwards and left uncut. With the tubes installed in the stopper, fit the stopper plates loosely in place with the 3 x 25mm phillips screw to hold the assembly together.

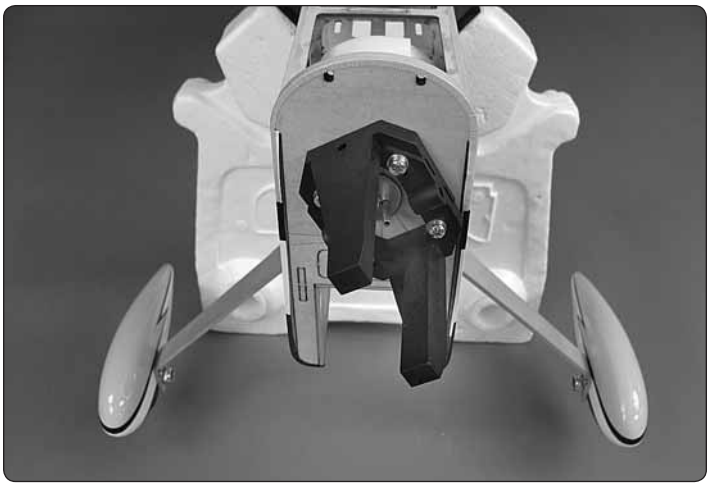


❏ 8. Make a strap 12" [305mm] long by overlapping the mating ends of the included hook and loop material 1" [25mm].

❏ 9. Loop the strap through the slots behind the fuel tank support. Fit the fuel tank onto the fuel tank support with the fuel tank neck through the hole in the firewall (be sure that the correct side of the tank is facing up). Draw the strap ends around the tank and confirm that the tank is secure.



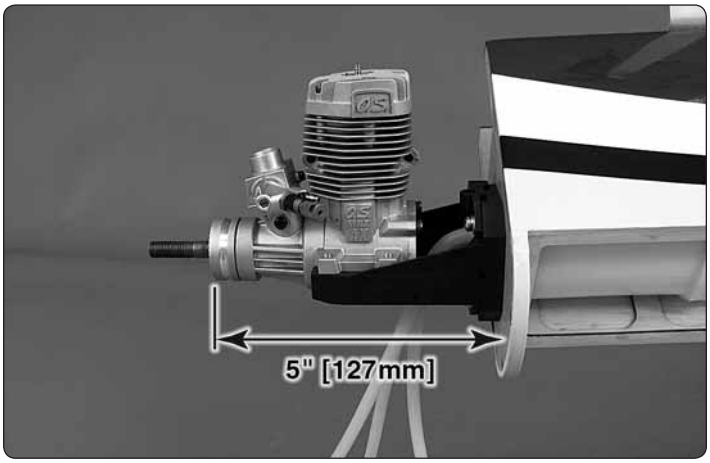
❏ 10. Locate the fuel tank brace. Position it behind the fuel tank as shown and glue it into place.

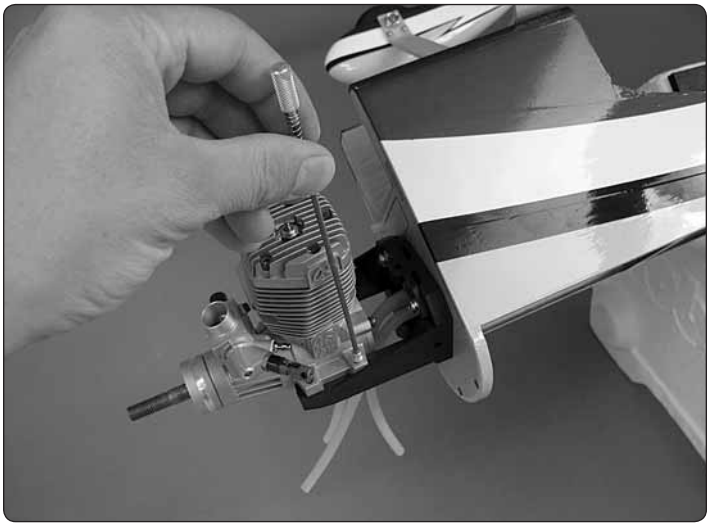


❏ 11. Loosely attach the engine mount halves to the firewall using four 6-32 x 3/4" [19mm] machine screws, four #6 lock

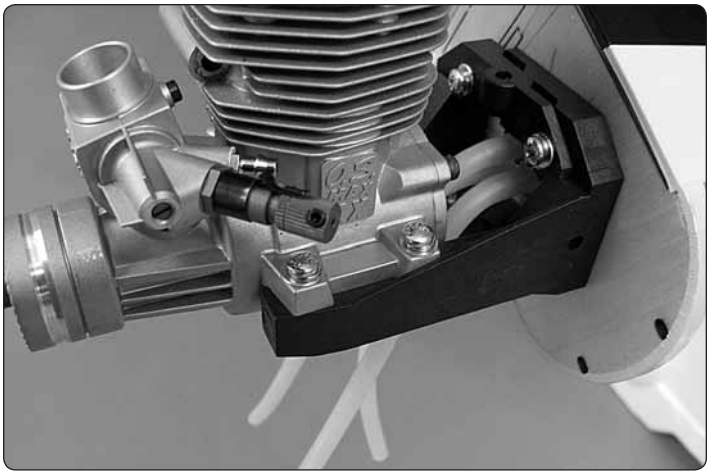
washers, four #6 flat washers and thread locking compound. The engine mount should be angled down and to the right. Fit your engine between the mount halves and slide them together against the crankcase. Remove the engine and finish tightening the mount screws.

❏ 12. Attach 6" [152mm] pieces of fuel tubing to each of the three fuel tank lines.



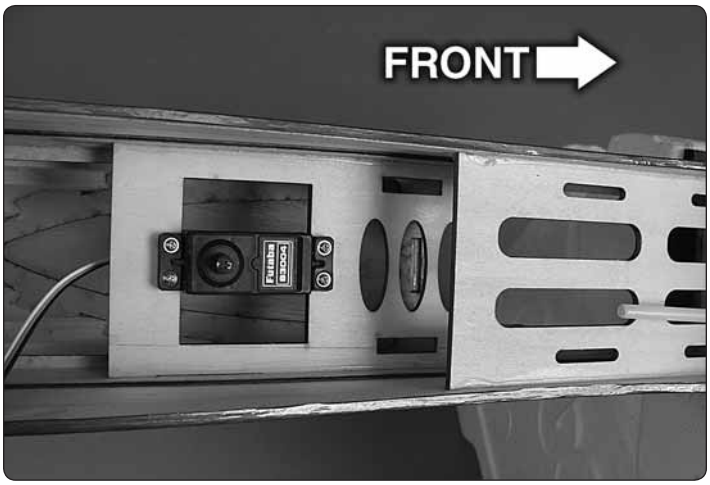


❏ 13. Position the engine onto the mount so the face of the drive washer is 5" [127mm] from the firewall. Use a Dead Center Hole Locator (GPMR8130) to mark the location of the engine tab mounting holes onto the engine mount rails.

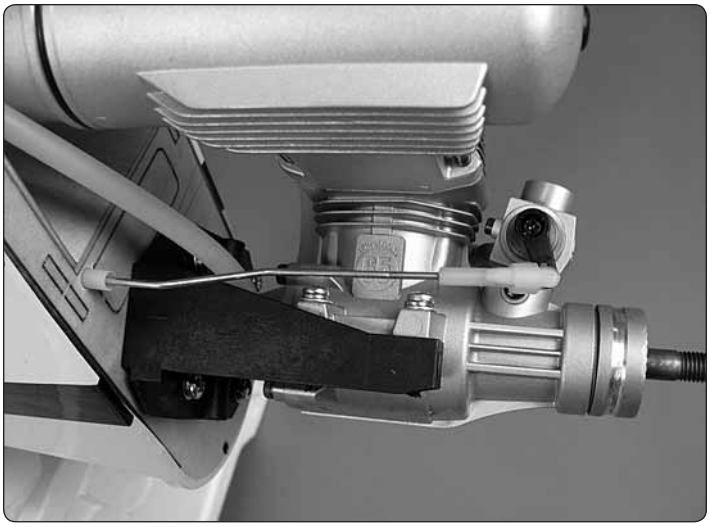


❏ 14. Use four 6-32 x 3/4" [19mm] machine screws, four #6 lock washers and four #6 flat washers to attach the engine to the engine mount.

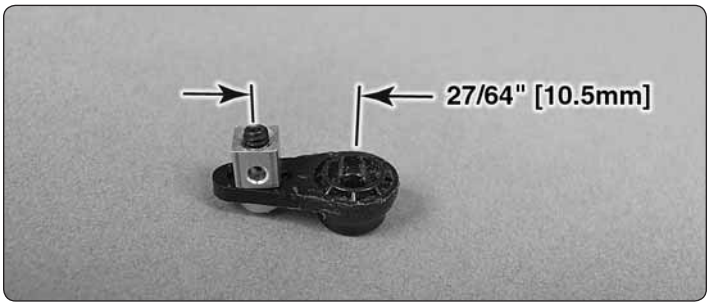
❏ 15. Mount the muffler to the engine and connect the vent and carb fuel lines to the engine. Plug the vent/fill line (if applicable) with the included nylon fuel line plug. The plug should stay in place during flight and only needs to be removed to fill or drain the fuel tank.



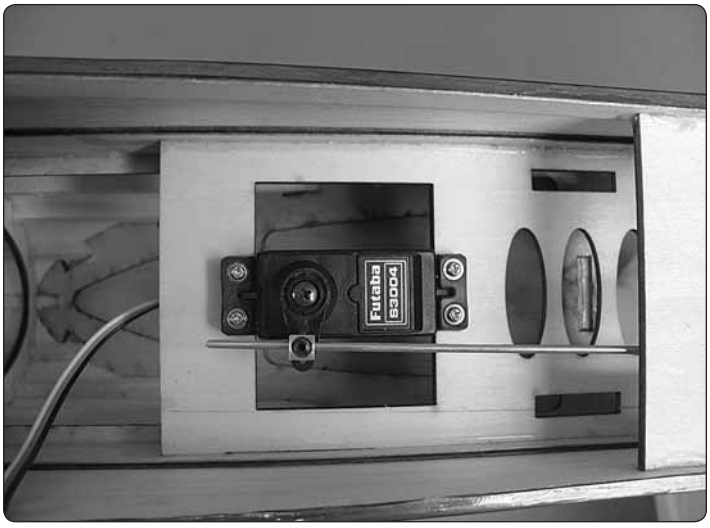
❏ 16. Mount the throttle servo in the middle of the servo tray. The servo spline should be toward the rear of the plane. Be sure to reinforce the mount screw holes with thin CA.



❏ 17. Bend the throttle pushrod so that it can reach the throttle arm on the carburetor without contacting any part of the engine or mount. Thread a nylon clevis onto the pushrod and slide a silicone clevis retainer onto the clevis. Insert the pushrod into the outer pushrod tube and connect the clevis to the outer hole in the throttle arm.

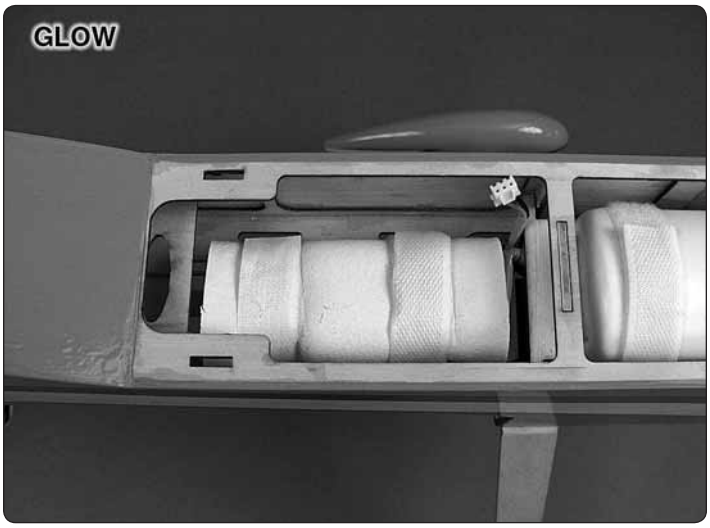


❏ 18. Cut all but one of the arms from a servo arm. Install a screw-lock pushrod connector into the hole in the remaining arm that is approximately 27/64" [10.5mm] from the center of the servo arm. Secure the screw-lock connector with a screw-lock connector retainer. Loosely thread a 4-40 set screw into the screw-lock connector.

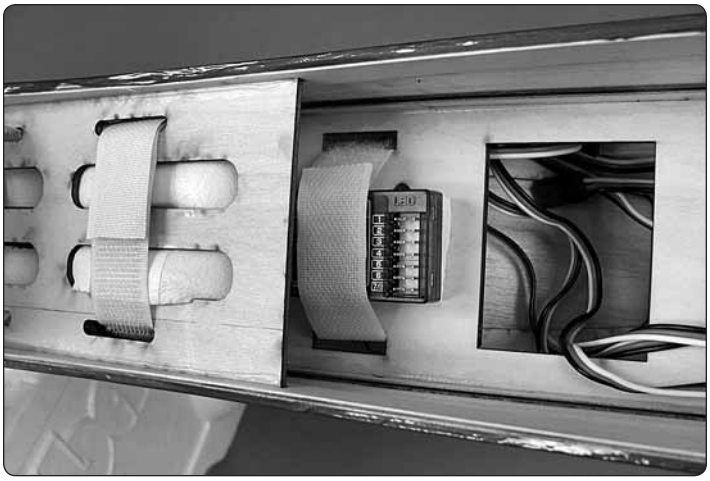


❏ 19. Center the throttle servo using your radio system (50% throttle). Insert the aft end of the throttle pushrod into the screw-lock connector and attach the servo arm to the throttle servo perpendicular to the servo case (be sure to install the servo arm screw). Adjust the carb barrel so that it is close to 50% open and tighten the set screw in the screw-lock connector. Test the operation of the throttle using your transmitter and confirm that the carb barrel properly opens and closes. Make any adjustments to the pushrod as necessary. When satisfied, cut off the excess pushrod 1/4" [6.4mm] aft of the screw-lock connector.

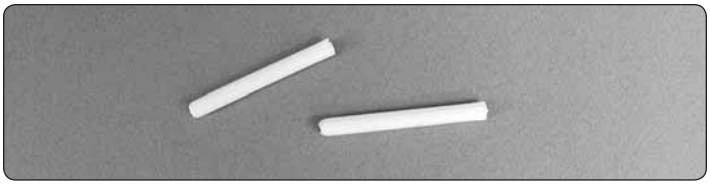
INSTALL THE RECEIVER, BATTERY, AND SWITCH

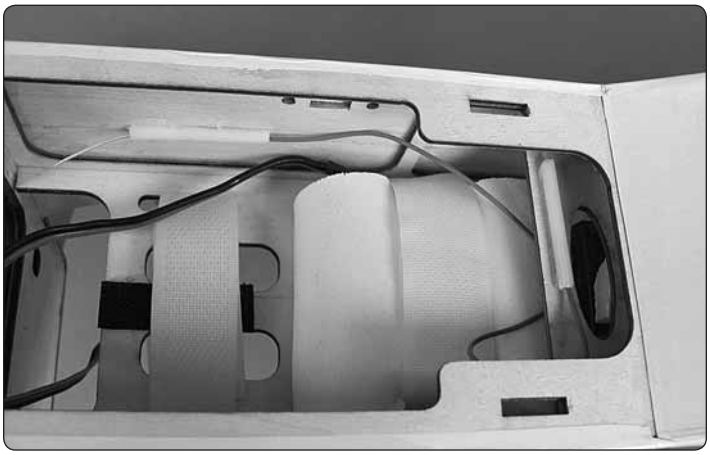


❏ 1. Wrap your receiver battery in 1/4" [6.4mm] foam rubber (not included) to protect it from motor vibration. If you have powered your model with a brushless motor, then a standard AA 4.8V flat receiver pack will fit at the aft end of the battery tray. If you installed a glow engine, a LiFe battery (lithium iron phosphate LiFePO4) can also be used because there is more space on the tray available behind the fuel tank. Cut pieces from the hook and loop material to make straps to secure the battery to the tray.



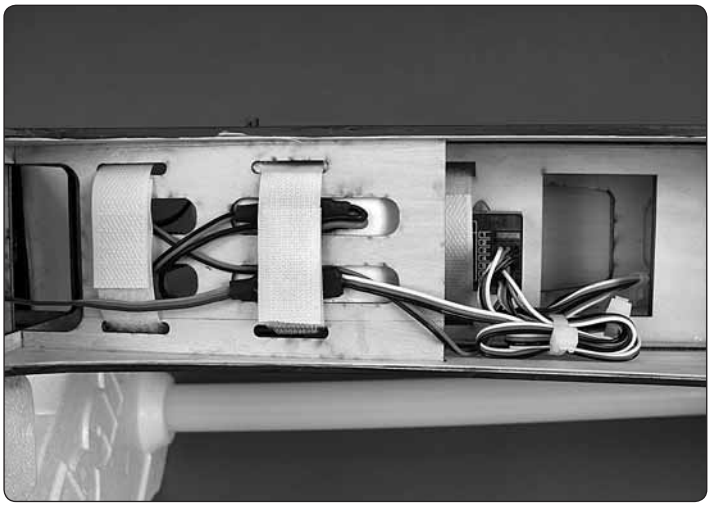
❏ 2. Strap your receiver behind the throttle servo bay. Be sure that there is foam rubber beneath the receiver.





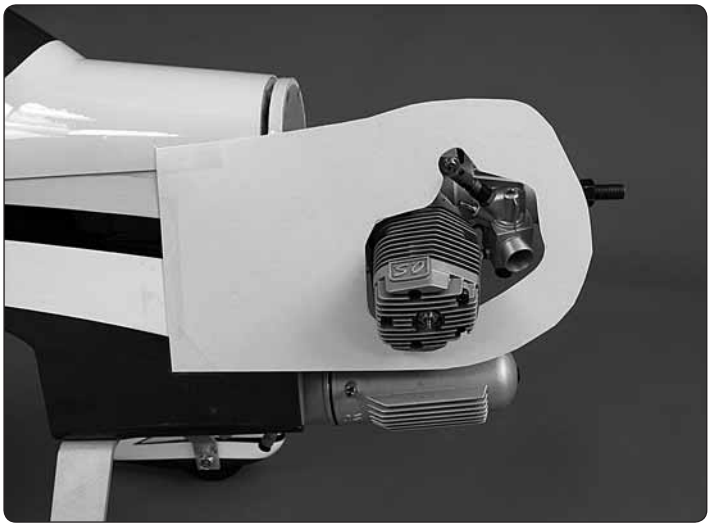
❏ 3. Locate the 2" [51mm] piece of antenna tube. Cut the tube in half and glue the pieces to the fuselage sides in an orientation so that the antenna ends are 90 degrees to each other (see your radio manual for additional information about antenna placement). Insert the antenna ends into the tubes.

❏ 4. Mount your switch harness on the side of the fuselage opposite your muffler. If your muffler is mounted in the fuselage cavity then either side will work fine. An optional charge jack receptable fits well in front of the switch. Note: If you are using a LiFe receiver pack then the charge jack receptable should be used for monitoring pack voltage, or charging in conjunction with the balancing lead. Do not attempt to charge a LiFe battery through this jack without also conencting to the balance lead! The balancing connector will remain accessible through the canopy hatch. To help prevent inadvertent charging of a LiFe battery through this jack without also connecting the balancing connector, we identified the battery type installed in our model with a LiFe Source decal.

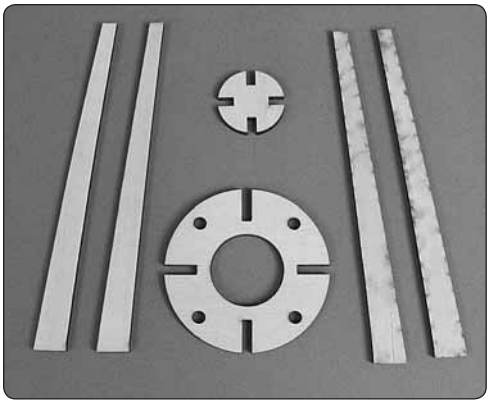


❏ 5. Connect your servos and switch to the receiver. If you installed a brushless motor, you will need to attach a 6" [152mm] servo extension to the ESC lead. Bundle the excess wires together using tie straps or something similar. We used the underside of the receiver battery strap to hold the servo lead extension and switch harness connector out of the way of the wing saddle area.

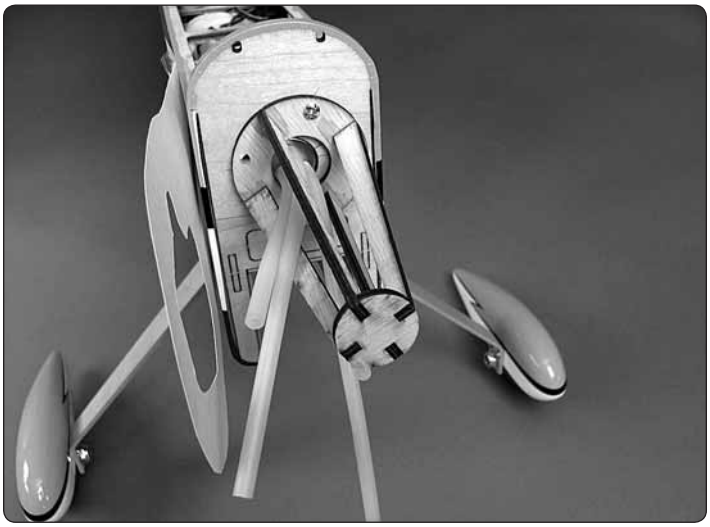
FINISH THE MODEL



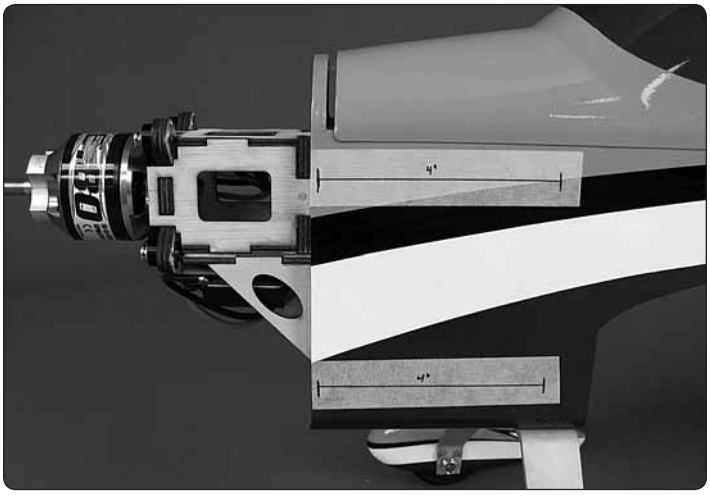
❏ 1. If you installed a glow engine, make card stock templates of any engine component that you will need to trim the cowl. We suggest starting with the minimum sized opening necessary to clear the engine parts. Then, as you test fit the cowl in place, you will need to enlarge the openings accordingly in order to be able to fit the cowl in place. If you installed a brushless motor then you will not need to make any cutouts in the cowl.



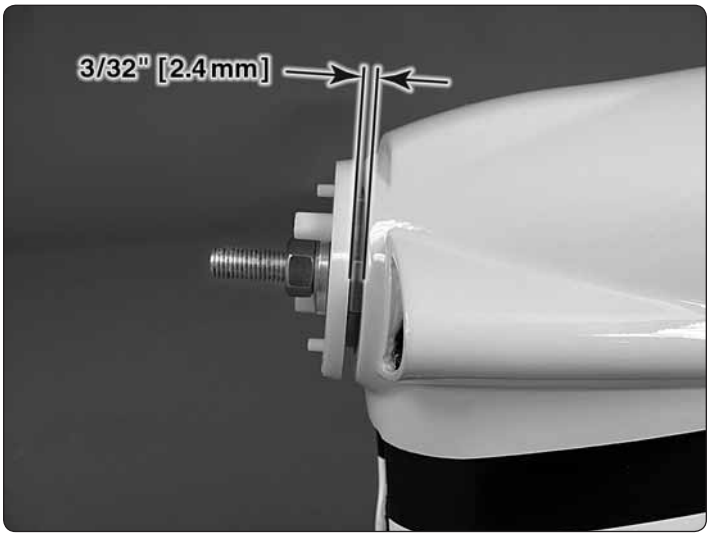
❏ 2. If you installed a glow engine, locate the plywood dummy engine parts and glue them together as shown. This dummy engine is provided as an aid to mount the cowl accurately without the engine in place.

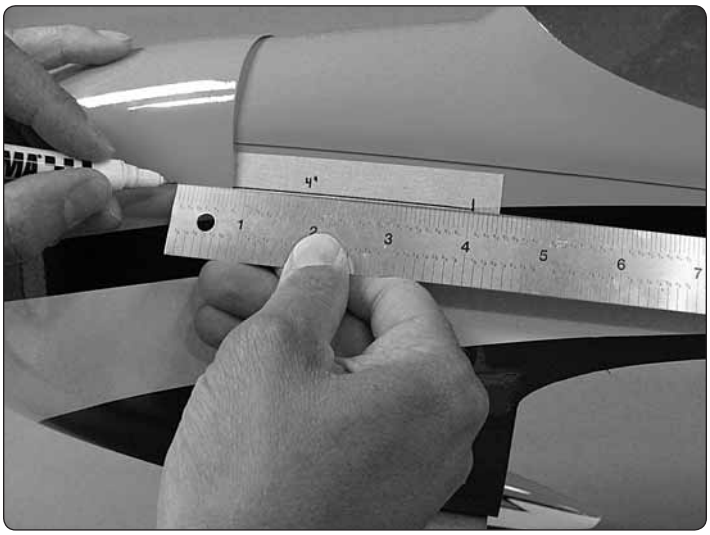


❏ 3. Temporarily remove the engine mount and engine from the firewall. Attach the dummy engine to the firewall. Only two 6-32 x 1/2" [13mm] screws are required to hold the dummy engine in place. Put a few washers on the bottom screw to prevent the end of the screw from contacting the fuel tank. The top screw will go over the top of the tank so washers are not required.

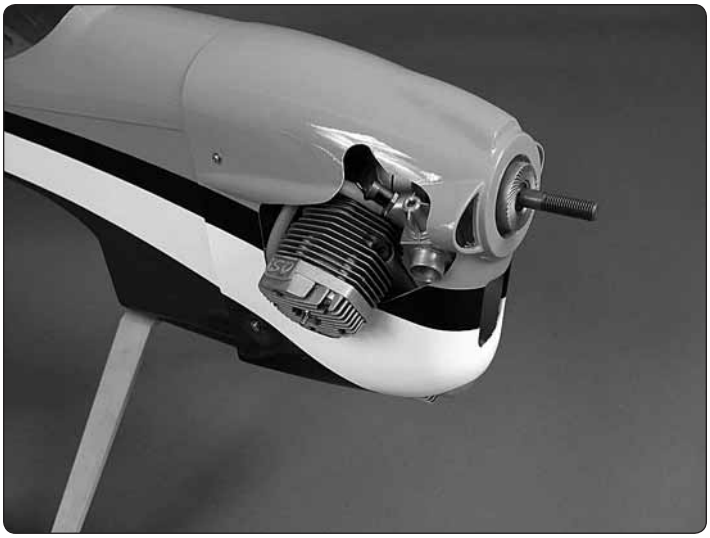


❏ 4. Put four pieces of masking tape onto the fuselage sides in the locations shown (two on each side). Mark onto the tape pieces exactly where the cowl mounting screw holes will be drilled. The holes should be located in the center of the thickness of the firewall. Use a ruler to draw straight lines exactly 4" [102mm] long aft of your cowl screw hole marks.



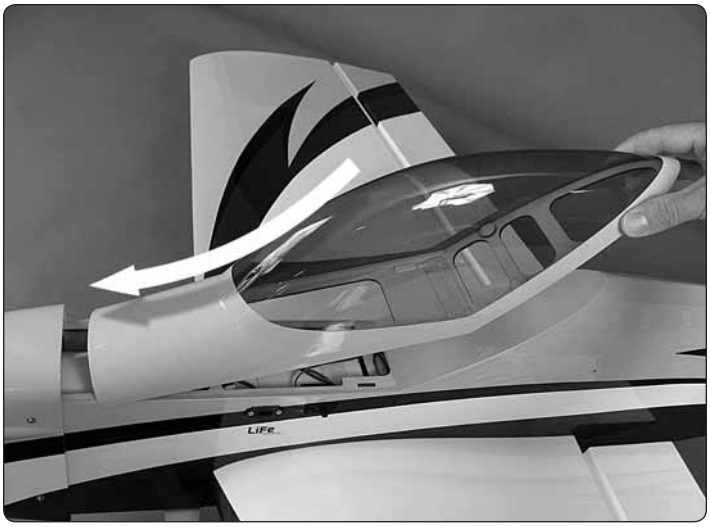


❏ 5. Fit the cowl onto the fuselage so that the prop adapter face (or the dummy engine front) is approximately 3/32" [2.4mm] forward of the front of the cowl. Align the colors on the cowl with the MonoKote color scheme on the fuselage and temporarily tape the cowl in place when satisfied with its position. From the lines you drew on the tape, transfer the cowl mounting hole marks onto the cowl. Drill 1/16" [1.6mm] holes through the marks on the cowl and into the firewall. Use the templates you made in step 1 to trace the patterns onto the cowl.



❏ 6. Remove the cowl and dummy engine (if applicable) from the fuselage. Use a rotary tool to cutout any openings in the cowl necessary for your power system installation. Reinstall the engine if you removed it from the firewall. Thread a #2 x 1/2" [13mm] screw into each cowl mounting hole in the fuselage and back it out. Apply a drop of thin CA glue to each hole and allow the glue to harden. Enlarge the holes in the cowl to 3/32" [2.4mm]. Test fit the cowl onto the fuselage and adjust your cutouts as necessary until the cowl is a good fit. When satisfied, install the cowl using four #2 x 1/2" [13mm] screws and four #2 flat washers.

❏ 7. Install the propeller and spinner onto the motor. You may need to enlarge the hole in the prop and spinner backplate with a reamer or drill to match the prop shaft of your power system. It may also be necessary to enlarge the cutouts in the spinner cone to fit your prop. The cone should not contact the prop at any point in the cut out.

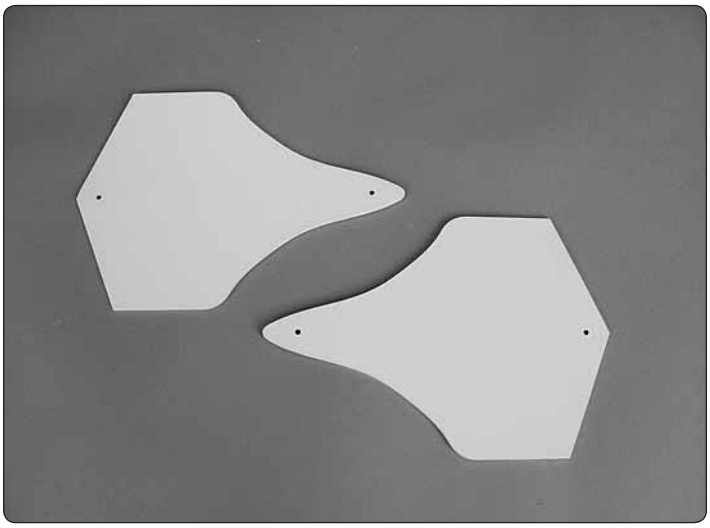


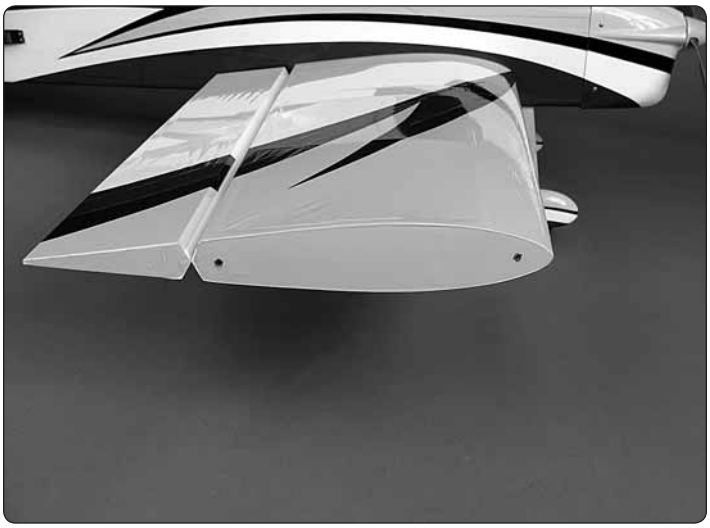
❏ 8. If you have not already discovered how to install the canopy hatch, align the two pins at the front of the hatch with the two holes in the firewall. Lay the aft end of the hatch down against the fuselage, aligning the tabs into the slots. Lock the hatch in place by sliding the hatch back, which will engage the magnets.

❏ 9. Admire your completed U-Can-Do SF ARF! Prepare to move on to the final sections for applying the decals, getting the control throws set and the plane balanced.

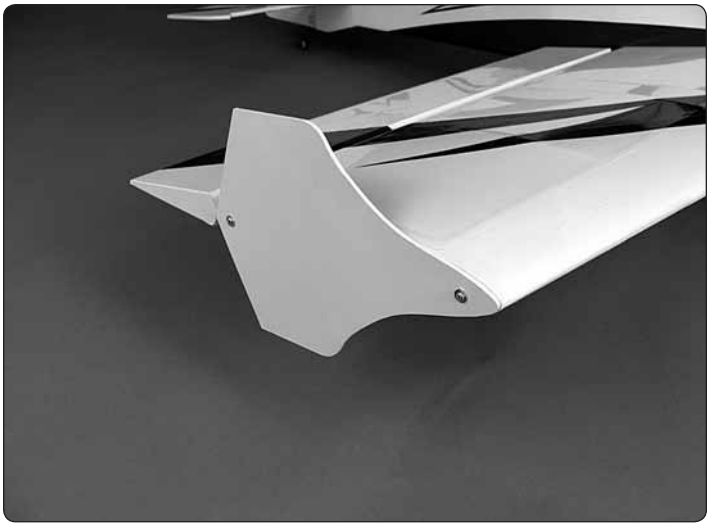
Optional Side Force Generators

Side force generators are included as an optional addition. The side force generators are designed to reduce wing walking in high-alpha maneuvers and reduce the amount of rudder input needed for knife-edge flight. The side force generators are easily installed and removed at your flying site. We recommend flying the model both with and without them to get a comparison of their benefits to your flying style and skill.





❏ 1. Trim the covering from the screw holes in the side force generators. You will also need to locate the blind nuts on the wing tips and trim the covering from them.



❏ 2. Install the side force generators onto the wing tips using four 4-40 x 1/2" [13mm] machine screws, four #4 flat washers and thread locking compound.

Apply the Decals

❏ 1. Use scissors or a sharp hobby knife to cut the decals from the sheet.

❏ 2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water—about one teaspoon of soap per gallon of water. Submerse the decal in the soap and water and peel off the paper backing. **Note:** Even though the decals have a "sticky-back" and are not the water transfer type, submersing them in soap & water allows accurate positioning and reduces air bubbles underneath.

❏ 3. Position decal on the model where desired. Holding the decal down, use a paper towel to wipe most of the water away.

❏ 4. Use a piece of soft balsa or something similar to squeegee remaining water from under the decal. Apply the rest of the decals the same way.

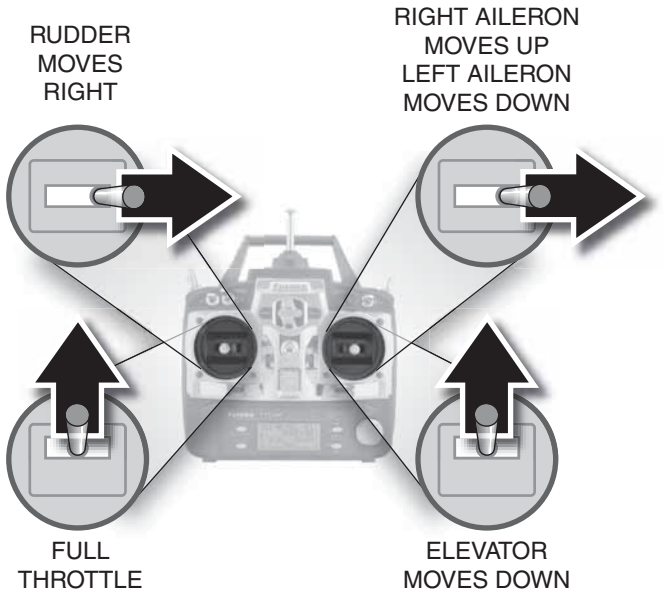
GET THE MODEL READY TO FLY

Check the Control Directions

❏ 1. Turn on the transmitter and receiver and center the trims. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the screws that hold on the servo arms.

❏ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to center the control surfaces. If you installed retracts, confirm their operation and that they lock both in the up and down positions.

4-CHANNEL RADIO SET UP (STANDARD MODE 2)



❏ 3. Make certain that the control surfaces and the throttle respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces have remained centered. Adjust if necessary.

Set the Control Throws

Use a Great Planes AccuThrow (or a ruler) to accurately measure and set the control throw of each control surface as indicated in the chart that follows. If your radio does not have dual rates, we recommend setting the throws at the **low** rate setting.

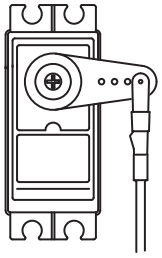
NOTE: The throws are measured at the **widest part** of the elevators, rudder and ailerons.

These are the recommended control surface throws:			
	LOW	**HIGH**	**3D**
ELEVATOR Up & Down	3/4" [19mm] 11°	1" [25mm] 15°	2-5/16" [59mm] 36°
RUDDER Right & Left	1-1/8" [29mm] 10°	2-1/2" [64mm] 23°	4" [102mm] 39°
AILERONS Up & Down	5/8" [16mm] 8°	15/16" [24mm] 12°	1-1/2" [38mm] 20°

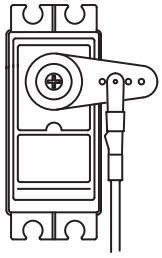
IMPORTANT: The U-Can-Do SF has been **extensively** flown and tested to arrive at the throws at which it flies best. Flying your model at these throws will provide you with the greatest chance for successful first flights. If, after you have become accustomed to the way the U-Can-Do SF flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model difficult to control, so remember, "more is not always better."

At the Servos

The pushrod farther out means **More Throw**

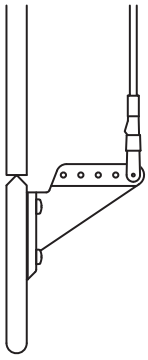


The pushrod closer in means **Less Throw**

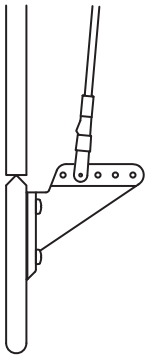


At the Control Surfaces

The pushrod farther out means **Less Throw**

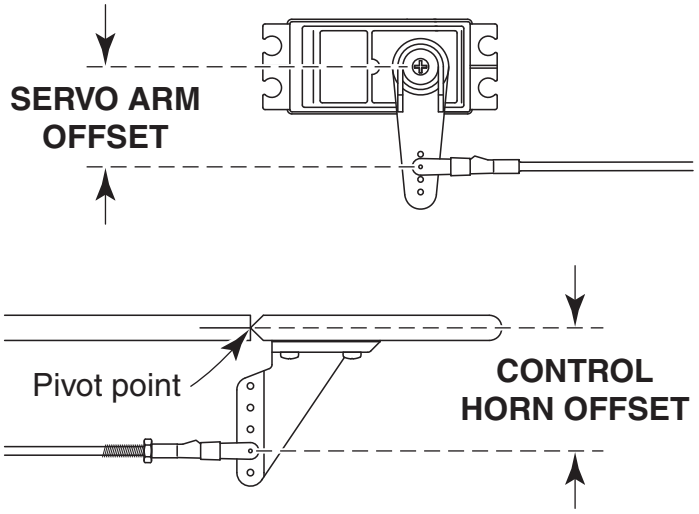


The pushrod closer in means **More Throw**



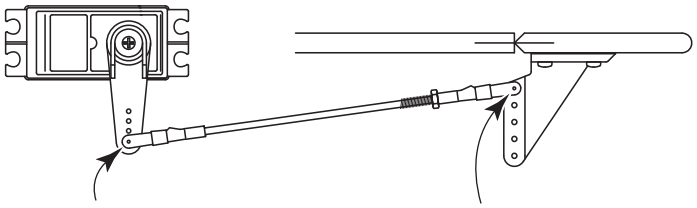
❏ 1. If necessary, adjust the location of the pushrod on the servo arm or on the elevator horn, or program the ATVs in your transmitter to increase or decrease the throw according to the measurements in the control throws chart.

Proper Pushrod Hookup; Avoiding Flutter, Maximizing Servo Output Torque



When connecting pushrods and setting up your control throws, it is **critically important** to use proper pushrod geometry—that is the distance from the pushrod on the servo arm to the center of the output shaft (**servo arm offset**) compared to the distance from the pushrod on the control horn to the pivot point (**control horn offset**).

Extremely Dangerous
Pushrod Hookup

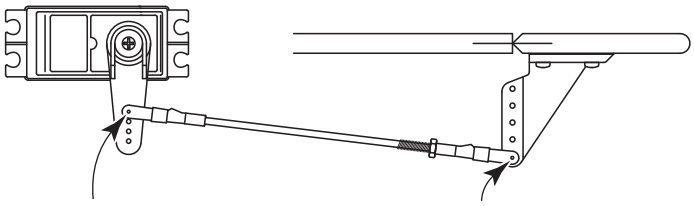


Pushrod far out on the servo arm…

…pushrod close in on the control horn.

One particularly dangerous situation arises when the pushrod on the servo arm is too "far out" and the pushrod on the control horn is too "close in." This setup is usually chosen by pilots who are trying to achieve maximum, "monster" control throws for 3D flight. But with your pushrods set up this way, any free play (slop) in the linkages or servo will be greatly magnified, possibly causing destructive control surface flutter. Additionally, if you have to turn your ATV's way down for "normal" throw, the result will be poor resolution and poor servo holding/centering capabilities. More importantly, too much force may be transmitted back to the servo, possibly causing control surface blowback, stripped servo gears or stripped servo arms—the latter two likely causing a crash.

Preferred
Pushrod Hookup

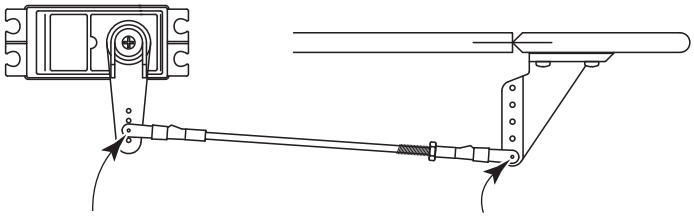


"Closest in" on servo arm

"Farthest out" on control horn

Here is an optimum pushrod setup—the pushrod is "close in" on the servo arm and "far out" on the control horn. This situation gives the greatest mechanical advantage of the servo over the control surface which will increase the servo's centering capabilities and output torque, minimize any free play in the system and allow high ATV settings for optimum servo resolution and positive control "feel." **Note:** When the pushrod is "close in" on the servo arm, make certain the servo arm can travel through its full range of movement without the pushrod (or clevis or other type of connector) interfering with the servo arm, output shaft or servo case.

Acceptable
Pushrod Hookup



Move the pushrod farther out on the servo arm…

…But leave the pushrod in the farthest out location on the control horn.

If the optimum situation doesn't provide enough control throw, the pushrod may be moved inward on the control horn, but it's better to go **farther out** on the servo arm because this will introduce less free play than the alternative. Only after moving the pushrod all the way out on the servo arm, if you still can't get the throw required, you'll have to resort to moving the pushrod closer in on the control horn. **Note:** If you have a computer radio, it is always desirable to set your ATV's to 100% (or as near 100% as possible to achieve the control throw required). If setting up a model that requires extraordinary control surface throw (for 3D flying for example), start by "maxing-out" your ATV's (typically 130% – 140%). Then, the dual rates in your "normal" flight mode will still be acceptably high (70% – 80%) for good servo resolution.

❑ 2. Referring to the **Proper Pushrod Hookup** illustrations above, adjust the location of the pushrod on the servo arm or on the elevator horn and program the ATVs in your transmitter to increase or decrease the throw according to the measurements in the control throws chart.

❏ 3. Measure and set the **low rate** elevator throws and the high and low rate throws for the rest of the control surfaces the same way.

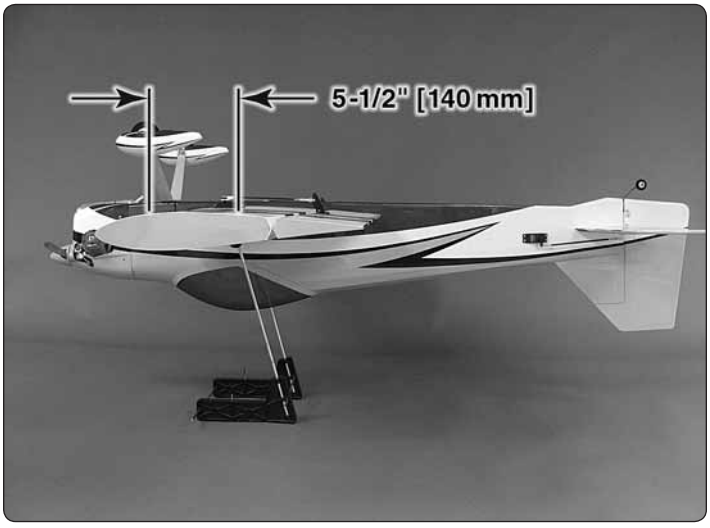
Balance the Model (C.G.)

More than any other factor, the **C.G.** (balance point) can have the **greatest** effect on how a model flies, and may determine whether or not your first flight will be successful. If you value this model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that is not properly balanced will be unstable and possibly unflyable.

At this stage the model should be in ready-to-fly condition with all of the systems in place including the engine or brushless motor, landing gear, and the radio system (and battery pack if applicable).

❏ 1. Use a felt-tip pen or 1/8" [3mm]-wide tape to accurately mark the C.G. on the top of the wing on both sides of the fuselage. The C.G. is located 5-1/2" [140 mm] back from the leading edge of the wing.

This is where your model should balance for the first flights. Later, you may wish to experiment by shifting the C.G. up to 1" [25 mm] forward or 3/4" [19 mm] back to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but the model may then require more speed for takeoff and make it more difficult to slow for landing. Moving the C.G. aft makes the model more maneuverable, but could also cause it to become too difficult to control. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



❏ 2. With the wing attached to the fuselage, all parts of the model installed (ready to fly) and an empty fuel tank, place the model on a Great Planes CG Machine upside down, or lift it at the balance point you marked.

❏ 3. If the tail drops, the model is "tail heavy" and the battery pack and/or receiver must be shifted forward or weight must be added to the nose to balance. If the nose drops, the model is "nose heavy" and the battery pack and/or receiver must be shifted aft or weight must be added to the tail to balance. If possible, relocate the battery pack and receiver to minimize or eliminate any additional ballast required. If additional weight is required, nose weight may be easily added by using a "spinner weight" (GPMQ4645 for the 1 oz. [28g] weight, or GPMQ4646 for the 2 oz. [57g] weight). If spinner weight is not practical or is not enough, use Great Planes (GPMQ4485) "stick-on" lead. A good place to add stick-on nose weight is to the firewall (don't attach weight to the cowl—it is not intended to support weight). Begin by placing incrementally increasing amounts of weight on the bottom of the fuse over the firewall until the model balances. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added by cutting open the bottom of the fuselage and gluing it permanently inside.

Note: Do not rely upon the adhesive on the back of the lead weight to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive and cause the weight to fall off. Use #2 sheet metal screws, RTV silicone or epoxy to permanently hold the weight in place.

❏ 4. **IMPORTANT:** If you found it necessary to add any weight, recheck the C.G. after the weight has been installed.

Balance the Model Laterally

❏ 1. With the wing level, have an assistant help you lift the model by the engine propeller shaft and the bottom of the fuse under the TE of the fin. Do this several times.

❏ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

PREFLIGHT

Identify Your Model

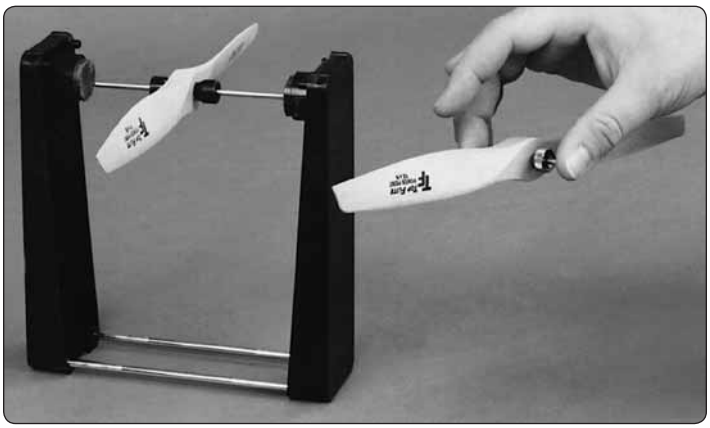
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 32 and place it on or inside your model.

Charge the Batteries

Follow the battery charging instructions that came with your radio control system to charge the batteries. You should always charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

CAUTION: Unless the instructions that came with your radio system state differently, the **initial** charge on **new** transmitter and receiver batteries should be done for 15 hours **using the slow-charger that came with the radio system**. This will "condition" the batteries so that the next charge may be done using the fast-charger of your choice. If the initial charge is done with a fast-charger the batteries may not reach their full capacity and you may be flying with batteries that are only partially charged.

Balance Propellers



Carefully balance your propeller and spare propellers before you fly. An unbalanced prop can be the single most significant cause of vibration that can damage your model. Not only will engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or quit.

We use a Top Flite Precision Magnetic Prop Balancer (TOPQ5700) in the workshop and keep a Great Planes Fingertip Prop Balancer (GPMQ5000) in our flight box.

Ground Check

If the engine is new, follow the engine manufacturer's instructions to break-in the engine. After break-in, confirm that the engine idles reliably, transitions smoothly and rapidly to full power and maintains full power—indefinitely. After you run the engine on the model, inspect the model closely to make sure all screws remained tight, the hinges are secure, the prop is secure and all pushrods and connectors are secure.

Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control (if using a 2.4GHz radio system, refer to the radio manual for the range checking procedure). Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test **with the engine running** at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash.

ENGINE SAFETY PRECAUTIONS

Failure to follow these safety precautions may result in severe injury to yourself and others.

Keep all engine fuel in a safe place, away from high heat, sparks or flames, as fuel is very flammable. Do not smoke near the engine or fuel; and remember that engine exhaust gives off a great deal of deadly carbon monoxide. Therefore **do not run the engine in a closed room or garage**.

Get help from an experienced pilot when learning to operate engines.

Use safety glasses when starting or running engines.

Do not run the engine in an area of loose gravel or sand; the propeller may throw such material in your face or eyes.

Keep your face and body as well as all spectators away from the plane of rotation of the propeller as you start and run the engine.

Keep these items away from the prop: loose clothing, shirt sleeves, ties, scarves, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the prop.

Use a "chicken stick" or electric starter to start the engine. Do not use your fingers to flip the propeller. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch it during or right after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine, causing a fire.

To stop a glow engine, cut off the fuel supply by closing off the fuel line or following the engine manufacturer's recommendations. Do not use hands, fingers or any other body part to try to stop the engine. Do not throw anything into the propeller of a running engine.

AMA SAFETY CODE

Read and abide by the following ***excerpts*** from the Academy of Model Aeronautics Safety Code. For the complete Safety Code refer to *Model Aviation* magazine, the AMA web site or the Code that came with your AMA license.

General

1) I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously, successfully flight tested.

2) I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right-of-way and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.

3) Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

5) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. Note: This does not apply to models while being flown indoors.

7) I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

Radio Control

1) I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2) I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3) At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed at or in the front of the flight line. Intentional flying behind the flight line is prohibited.

4) I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

5) **I will not knowingly operate my model within three miles of any pre-existing flying site except in accordance with the frequency sharing agreement listed** [in the complete AMA Safety Code].

9) Under no circumstances may a pilot or other person touch a powered model in flight; **nor should any part of the model other than the landing gear, intentionally touch the ground, except while landing.**

CHECK LIST

During the last few moments of preparation your mind may be elsewhere anticipating the excitement of the first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed before the model is flown. To help avoid this, a check list is provided to make sure these important areas are not overlooked. Many are covered in the instruction manual, so where appropriate, refer to the manual for complete instructions. Be sure to check the items off as they are completed (that's why it's called a *check list!*).

❏ 1. Check the C.G. according to the measurements provided in the manual.

❏ 2. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.

❏ 3. Extend your receiver antenna (if applicable).

❏ 4. Balance your model *laterally* as explained in the instructions.

❏ 5. Use threadlocking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.

❏ 6. Add a drop of oil to the axles so the wheels will turn freely.

❏ 7. Make sure all hinges are **securely** glued in place.

❏ 8. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl mounting screws, etc.).

❏ 9. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.

❏ 10. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.

❏ 11. Secure connections between servo wires and Y-connectors or servo extensions, and the connection between your battery pack and the on/off switch with vinyl tape, heat shrink tubing or special clips suitable for that purpose.

❏ 12. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).

❏ 13. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.

❏ 14. Make sure the fuel lines are connected and are not kinked.

❏ 15. Balance your propeller (and spare propellers).

❏ 16. Tighten the propeller nut and spinner.

❏ 17. Place your name, address, AMA number and telephone number on or inside your model.

❏ 18. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.

❏ 19. If you wish to photograph your model, do so before your first flight.

❏ 20. Range check your radio when you get to the flying field.

FLYING

The U-Can-Do SF is a great-flying model that flies smoothly and predictably. The U-Can-Do SF does not, however, possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

Fuel Mixture Adjustments

A fully cowled engine may run at a higher temperature than an un-cowled engine. For this reason, the fuel mixture should be richened so the engine runs at about 200 rpm below peak speed. By running the engine slightly rich, you will help prevent dead-stick landings caused by overheating.

CAUTION (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice an alarming or unusual sound such as a low-pitched "buzz," this may indicate control surface *flutter.* Flutter occurs when a control surface (such as an aileron or elevator) or a flying surface (such as a wing or stab) rapidly vibrates up and down (thus causing the noise). In extreme cases, if not detected immediately, flutter can actually cause the control surface to detach or the flying surface to fail, thus causing loss of control followed by an impending crash. The best thing to do when flutter is detected is to slow the model **immediately** by reducing power, then land as soon as safely possible. Identify which surface fluttered (so the problem may be resolved) by checking all the servo grommets for deterioration or signs of vibration. Make certain all pushrod linkages are secure and free of play. If it fluttered once, under similar circumstances it will probably flutter again unless the problem is fixed. Some things which can cause flutter are; Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of wire pushrods caused by large bends; Excessive free play in servo gears; Insecure servo mounting; and one of the most prevalent causes of flutter; Flying an over-powered model at excessive speeds.

Takeoff

Before you get ready to takeoff, see how the model handles on the ground by doing a few practice runs at **low speeds** on the runway. If you need to calm your nerves before the maiden flight, shut the engine down and bring the model back into the pits. Top off the fuel, then check all fasteners and control linkages for peace of mind. If you have dual rates on your transmitter, set the switches to "high rate" for takeoff, especially when taking off in a crosswind. Although this model has good low-speed characteristics, you should always build up as much speed as your runway will permit before lifting off, as this will give you a safety margin in case of a "flame-out." When you first advance the throttle the plane will usually turn left slightly. Correct by applying sufficient right rudder to hold it straight down the runway. When the plane has sufficient flying speed, lift off by smoothly applying up elevator (don't "jerk" it off into a steep climb!), and climb out gradually.

Flight

For reassurance and to keep an eye on other traffic, it is a good idea to have an assistant on the flight line with you. Tell him to remind you to throttle back once the plane gets to a comfortable altitude. While full throttle is usually desirable for takeoff, most models fly more smoothly at reduced speeds.

Take it easy with the U-Can-Do SF for the first few flights, gradually getting acquainted with it as you gain confidence. Adjust the trims to maintain straight and level flight. After flying around for a while and while still at a safe altitude with plenty of fuel, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how the model climbs as well. Continue to fly around, executing various maneuvers and making mental notes (or having your assistant write them down) of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your fuel level, but use this first flight to become familiar with your model before landing.

Landing

To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (into the wind) keeping the nose down to maintain airspeed and control. Level the attitude when the model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and climb out to make another attempt. When you're ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, the tail will settle onto the ground, giving you steering control. Remember to mind your fuel level. Do not wait until your tank is empty to begin your landing approach. You will need some fuel left if you need to abandon your approach and circle back around.

One final note about flying your model. Have a goal or flight plan in mind for **every** flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily to improve your skills (*though it is never a bad idea!)*, but more importantly so you do not surprise yourself by impulsively attempting a maneuver and suddenly finding that you've run out of time, altitude or airspeed. Every maneuver should be deliberate, not impulsive. For example, if you're going to do a loop, check your altitude, mind the wind direction (anticipating rudder corrections that will be required to maintain heading), remember to throttle back at the top, and make certain you are on the desired rates (high/low rates). A flight plan greatly reduces the chances of crashing your model just because of poor planning and impulsive moves. **Remember to think.**

3D Flying

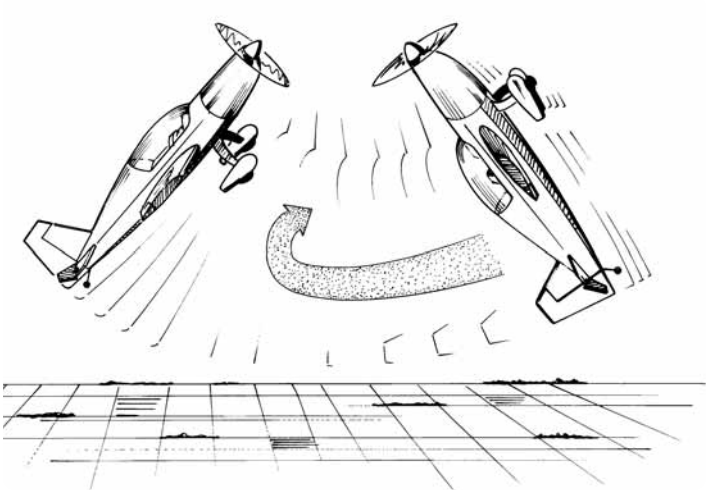
Learn to manage the throttle and experiment during 3D maneuvers. The power needed will depend on the maneuver being performed. C.G. also plays a large role in the 3D capability of models as well. Experiment a little, but keep in mind that being tail heavy is not always the best way to go.

Propeller thrust and thrust vectoring need to be considered for 3D aerobatics. A large diameter prop with a low pitch will provide a lot of pull for the aircraft but will not offer enough air moving across the tail surfaces (thrust vectoring) for 3D. Due to the large number of factors involved, some experimentation will be necessary to find the right propeller pitch and diameter for your model.

Higher RPM engines such as a .46 two-stoke require a low pitch propeller and lower RPM motors such as a 1.60 will require a higher pitch propeller. If you feel that the effectiveness of the tail surfaces is not enough, try a smaller propeller with a higher pitch.

Another thing to remember is that maximum control throw is not necessary for all 3D maneuvers. Occasionally, too much throw can place the model too far into a stall causing the model to become uncontrollable. Practice your maneuvers at a higher altitude while you become accustomed to your particular plane's stall characteristics.

Waterfalls



With the model pointing straight up (almost in a hover), push full down elevator and full throttle. As the model rotates and begins to point downwards, reduce the throttle (to keep the model from being pulled downwards). As the model flattens out, add power back in to pull the model around. A lot of models will require a little bit of rudder correction (usually right rudder) during this maneuver. Some planes will require a little aileron correction to keep the wings level as well.

Up-Right Flat Spins

Pull the nose up slightly and slowly decrease power. As the model slows down to a few mph, slowly add in full left rudder and power. Next, start adding in up elevator as needed to keep the model flat in the spin. Most airplanes will require some aileron as well to keep the wings level. This is one of the maneuvers to experiment on; try different C.G. positions and different amounts of throw and power to see how flat the spin will go. It is possible to get the flat spin without falling and it is also possible to climb during the spin.

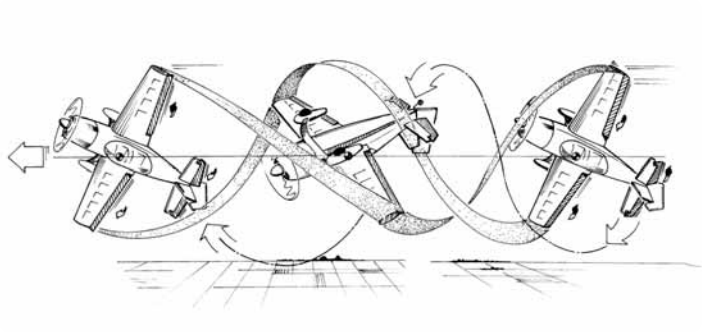
Inverted Flat Spins

This is the same as the up-right flat spin except most planes like to spin in the opposite direction, for example: right rudder and down elevator.

The Wall

Fly straight across the field at a moderate speed and simply pull full up until vertical. Adjust the power as necessary to maintain a hover.

Knife Edge Tumble



This is an impressive looking maneuver that really isn't as difficult as it looks. (Before learning this maneuver you must be able to confidently Snap and Tumble your plane and stop the aircraft exactly, without over rotating.) Fly the model Knife Edge from the right at a moderate airspeed, using just enough rudder to maintain Knife Edge, not climbing or diving. Perform one full right negative Tumble by maintaining your rudder setting while applying full throttle, full down elevator, and full right aileron, releasing in time to end again flying Knife Edge to the right. Note that you may need to use some positive elevator and/or left aileron to stop the Tumble at exactly Knife Edge. This maneuver is easier to the right because torque helps stop the Tumble and it can be done at varied airspeeds with proper throttle and rudder modulation.

Vertical Hover

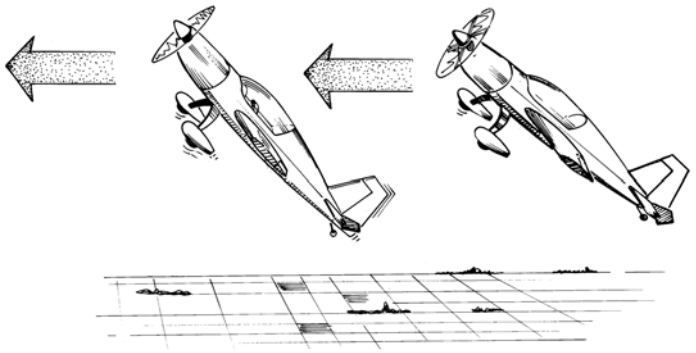
Fly a straight pass across the field at 75 ft high and 100 ft out and pull the model vertical. Roll the model until the top of it is facing you and slowly begin to reduce power. As the model begins to slow down to 10 mph or so, slowly add a little bit of power back in. You will have to adjust the throttle as needed, but make your adjustments smooth. Some right aileron may be needed to keep the model from torque rolling. Use the

rudder and elevator to keep the nose pointing straight up. Be patient as this maneuver will take a while to learn.

Torque Roll

This is the same as the vertical hover but without the use of right aileron to keep the model from rolling. If needed, you can use a little left aileron to speed the roll up. As the model rotates around, the controls will appear to be reversed to you but only the orientation of the model has changed.

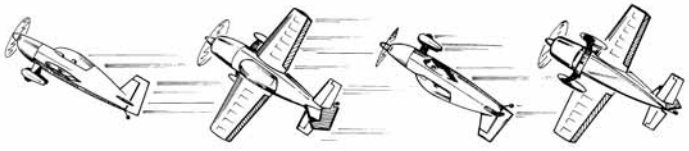
Harrier



The harrier is nothing more than a high angle of attack flying stall. Check the stall characteristics of your plane before proceeding with this maneuver. Bring your plane across the field at 75 ft high and 100 ft out away from yourself. Slowly pull back on the elevator while reducing throttle. The nose of the plane should come up. Depending on the plane/setup, you may have to make constant aileron (wing walking) and rudder corrections for this maneuver. As the nose of the plane comes up, start adding in a little bit of power to help maintain airspeed. The rudder is now used to turn the model. This maneuver will take some practice as there are a lot of small corrections made to keep most planes in the maneuver.

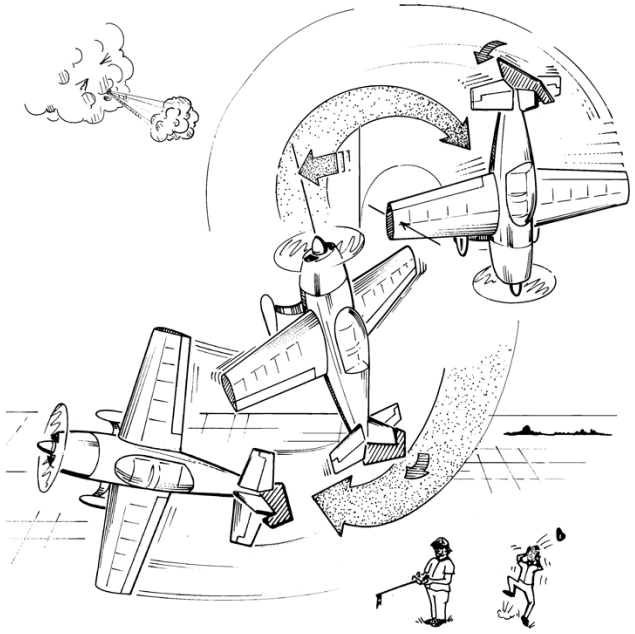
This is one maneuver where less control is needed. Too much elevator and the model goes into an uncontrollable stall. The C.G. of the plane will have a large effect on the stability of the model during this maneuver. Some planes perform better with more elevator deflection and a farther forward C.G. while other planes prefer a further aft C.G. and less elevator deflection. Elevator to flap mixing can be used on airplanes with marginal wing area, and some planes won't stall so elevator to spolieron mixing will be needed.

Rolling Harrier



Once you get comfortable with the up-right harrier, it's time to work rolls into the mix. From an up-right harrier, add in left aileron and change from up elevator to down elevator when inverted. If you are comfortable with four point rolls and slow rolls, inputting rudder on the knife edges can improve the maneuver considerably. To turn the model, simply input the elevator or rudder a little earlier. It's all a matter of timing.

Pinwheel



Climb vertically and bring the model to a vertical hover, but do not stop long enough to let the torque pull the model around (climbing or sliding slightly will not be noticeable to spectators but will keep air flowing over the ailerons and provide you roll authority to stop the torque). When the model is hanging, rock the plane left with rudder, then apply full throttle and full right rudder and hold both, completing 3/4s of a VERY tight Knife Edge Loop and flying out Knife Edge. When done correctly, the plane pivots around the wingtip in a very small area. This maneuver can be done either direction.

Have a ball! But always stay in control and fly in a safe manner.

GOOD LUCK AND GREAT FLYING!

This model belongs to:

Name

Address

City, State, Zip

Phone Number

AMA Number