

Mini CONTENDER

EP



INSTRUCTION MANUAL



Top Flite Models Champaign, IL
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WARRANTY

Top Flite® 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 Top Flite's liability exceed the original cost of the purchased kit.** Further, Top Flite reserves the right to change or modify this warranty without notice.

In that Top Flite 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	Hobby Services	Technical Assistance Call
the defective part or item to	3002 N. Apollo Dr. Suite 1	(217) 398-8970
Hobby Services at this address:	Champaign IL 61822 USA	productsupport@top-flite.com

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.

SPECIFICATIONS

Wingspan:	36 in [915mm]
Wing Area:	329 sq in [21.2 dm ²]
Weight:	27–30 oz [765–850 g]
Wing Loading:	11.8–13.1 oz/sq ft [36–40 g/dm ²]
Length:	34.5 in [875mm]
Radio:	4 channel
Motor:	RimFire .10

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

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INTRODUCTION

The original Top Flite Contender kit was introduced over forty years ago. By popular demand, thirteen years ago the Contender kit was re-introduced following today's high quality kit standards. With the advancements in electric powered planes, we now bring you the new Electric Powered Mini Contender EP ARF. With the traditional looks of the original Contender and the quiet, clean power of electrics, we think you will be impressed with the performance of the Mini Contender EP ARF.

For the latest technical updates or manual corrections to the Mini Contender EP ARF visit the Top Flite web site at www.top-flite.com. Open the "Airplanes" link, then select the Mini Contender EP 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

If you are not already a member of the AMA, please join! The AMA is the governing body of model aviation and membership provides liability insurance coverage, protects modelers' rights and interests and is required to fly at most R/C sites.

Academy of Model Aeronautics

5151 East Memorial Drive
Muncie, IN 47302-9252

Ph. (800) 435-9262
Fx (765) 741-0057



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 AND OTHERS... FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS

1. Your Mini Contender EP 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 Mini Contender EP ARF, 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 good condition, a correctly sized motor, and other components as specified in this instruction manual. All components must be correctly installed so that the model operates correctly on the ground and in the air. You must check the operation of the model and all components before **every** flight.
5. 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.
6. While this model has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if a motor larger than one that is recommended 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.

We, as the manufacturer, provide you with a top quality, thoroughly tested ARF 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 Mini Contender EP ARF that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

POWER RECOMMENDATIONS

The plane has been designed to use the RimFire .10, Silver Series SS-25 ESC, APC 9x6E prop and 11.1V 1800mAh to 2200mAh LiPo battery.

- (1) RimFire™ .10 (GPMG4595)
- (1) Silver Series SS-25 (GPMM1820)
- (1) APC 9×6E propeller (APCQ4118)
- (1) Great Planes® Power Series LiPo 1800mAh 11.1V 25C discharge w/balance plug (GPMP0515)
- (1) ElectriFly® Plug-and-Play LiPo 1800mAh 11.1V 30C discharge w/balance plug (GPMP0855)
- (1) ElectriFly Plug-and-Play LiPo 2200mAh 11.1V 30C discharge w/balance plug (GPMP0861)

RADIO EQUIPMENT

The Mini Contender EP ARF requires a 4-channel radio with four Micro Servos with at least 21oz-in. [1.5kg-cm] of torque.

- (4) Futaba® S3114 Micro High Torque Servo (FUTM0414)
- (1) 6" [152mm] Y-harness for ailerons (FUTM4130)
- (4) 6" [152mm] Servo extension (FUTM4506)

CHARGER RECOMMENDATIONS

- Great Planes PolyCharge4™ DC 4 Output LiPo Charger (GPMM3015)
- Great Planes ElectriFly Triton™ JR DC Computer Charger (GPMM3152)

When using the PolyCharge 4 or the Triton JR we highly recommend using an Equinox™ LiPo Cell Balancer (GPMM3160)

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

ADDITIONAL ITEMS REQUIRED

ADHESIVES AND BUILDING SUPPLIES

This is the list of Adhesives and Building Supplies that are required to finish the Mini Contender EP ARF

- 1/2 oz. [15g] Thin Pro™ CA (GPMR6001)
- Pro 6-minute epoxy (GPMR6045)
- Threadlocker thread locking cement (GPMR6060)
- Mixing sticks (50, GPMR8055)
- Mixing cups (GPMR8056)
- Epoxy brushes (6, GPMR8060)
- Denatured alcohol (for epoxy clean up)
- Masking tape (TOPR8018)
- Paper Towels
- Drill
- Drill bits: 1/16" [1.6mm], #55 [1.3mm], 3/32" [2.4mm]
- Stick-on segmented lead weights (GPMQ4485)
- #1 Hobby knife (RMXR6903)
- #11 blades (5-pack, RMXR6930)
- Phillips head screwdriver
- Crescent wrench
- 3/32", 2.5mm Hex wrench

COVERING TOOLS

- Top Flite® MonoKote® sealing iron (TOPR2100)
- Top Flite Hot Sock™ iron cover (TOPR2175)
- Top Flite MonoKote trim seal iron (TOPR2200)
- Top Flite MonoKote heat gun (TOPR2000)

OPTIONAL SUPPLIES AND TOOLS

Here is a list of optional tools mentioned in the manual that will help you build the Mini Contender EP ARF

- 2 oz. [57g] spray CA activator (GPMR6035)
- CA applicator tips (HCAR3780)
- CA debonder (GPMR6039)
- 36" metal ruler (HCAR0475)
- Hobbico® High Precision Diagonal Cutter 5" (HCAR0630)
- Pliers with wire cutter (HCAR0625)
- Robart Super Stand II (ROBP1402)
- AccuThrow™ Deflection Gauge (GPMR2405)
- CG Machine™ (GPMR2400)
- Precision Magnetic Prop Balancer (TOPQ5700)
- Williams Brothers 1/8 Pilot Bust Kit (WBRQ1090)

IMPORTANT BUILDING NOTES

- Anytime a sheet metal screw is installed in wood, first install the screw, remove the screw and apply a couple of drops of thin CA in the hole to harden the threads. After the CA has cured, reinstall the screw.
- **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 Mini Contender EP ARF is factory-covered with Top Flite MonoKote film. Should repairs ever be required, MonoKote can be patched with additional MonoKote purchased separately. MonoKote is packaged in six-foot rolls, but some hobby shops also sell it by the foot. If only a small piece of MonoKote is needed for a minor patch, perhaps a fellow modeler would give you some. MonoKote is applied with a model airplane covering iron, but in an emergency a regular iron could be used. A roll of MonoKote

includes full instructions for application. Following are the colors used on this model and order numbers for six foot rolls.

White (TOPQ0204) **True Red** (TOPQ0227)

- The stabilizer and wing incidences and motor 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.top-flite.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.

MODEL INSPECTION

Before starting to build, take an inventory of this model 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 instruction manual.

Top Flite Product Support

3002 N. Apollo Drive, Suite 1 Ph: (217) 398-8970
Champaign, IL 61822 Fx: (217) 398-7721

E-mail: airsupport@top-flite.com

ORDERING REPLACEMENT PARTS

Replacement parts for the Top Flite Mini Contender EP ARF 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. Not all parts are available separately (an aileron cannot be purchased separately, but is only available with the wing kit). Replacement parts are not available from Product Support, but can be purchased from hobby shops or mail order/Internet order firms. Hardware items (screws, nuts, bolts) are also available from these outlets.

To locate a hobby dealer, visit www.top-flite.com and click on "Where to Buy". 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 **Hobby Services**
and payments by 3002 N Apollo Drive, Suite 1
personal check to: Champaign IL 61822

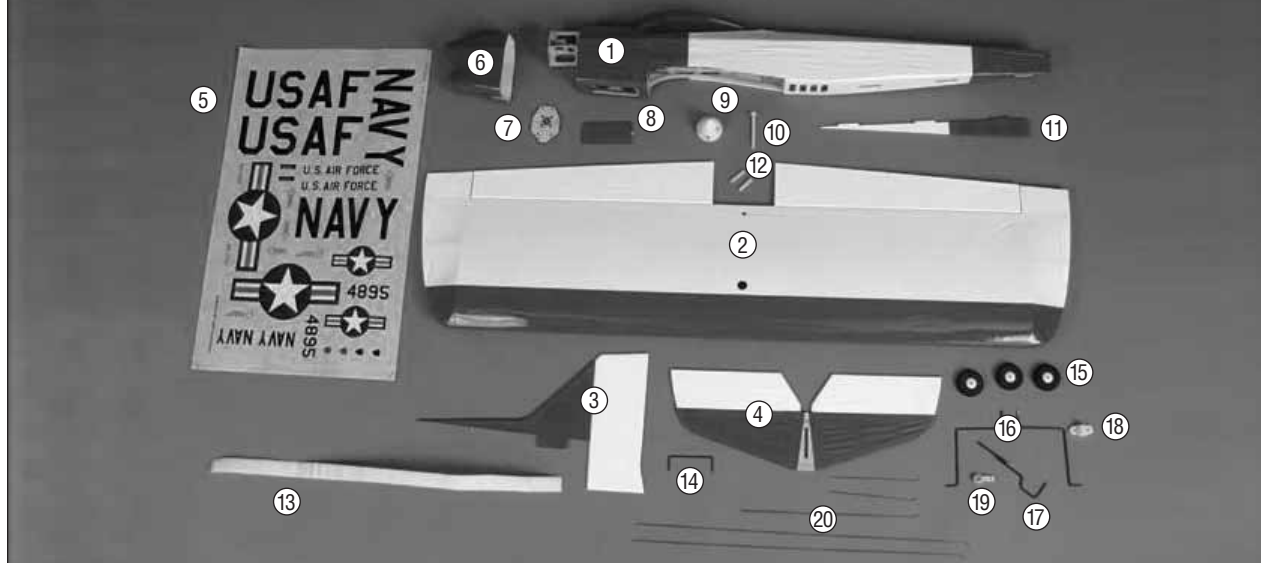
Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

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

REPLACEMENT PARTS LIST

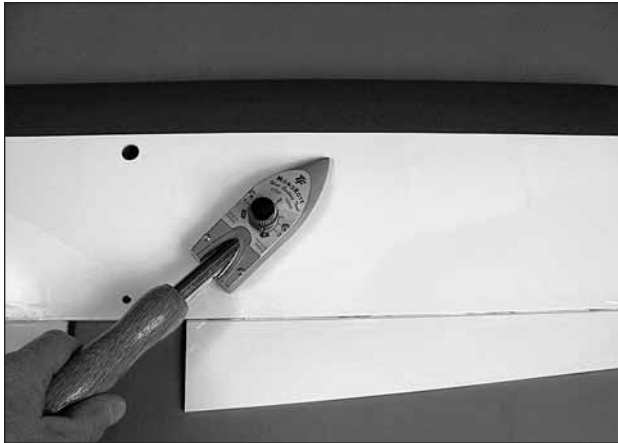
Order No.	Description
TOPA1900	Wing
TOPA1901	Fuselage
TOPA1902	Tail Surfaces
TOPA1903	Cowl
TOPA1904	Canopy
TOPA1905	Landing Gear
TOPA1906	Decals
TOPA1907	Spinner

CONTENTS



1. Fuselage	6. Cowl	11. Lower Fin	16. Main Landing Gear
2. Wing	7. Motor Mount	12. Wing Dowels	17. Nose Gear
3. Fin & Rudder	8. Compartment Cover	13. Hook & Loop	18. Nose Gear Block
4. Stabilizer & Elevator	9. Spinner	14. Elevator Joiner Wire	19. Steering Arm
5. Decal	10. Wing Bolt	15. Wheels	20. Pushrods

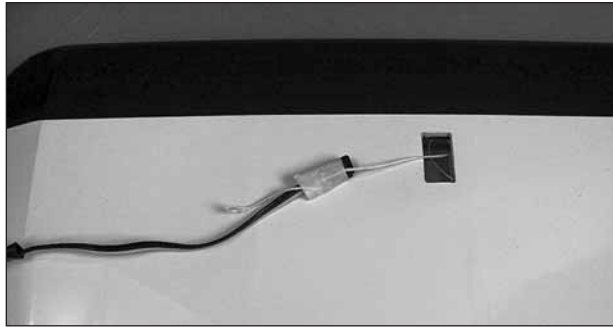
ASSEMBLE THE WING



❑ 1. If necessary, use a covering iron with a covering sock to go over the wing and aileron to remove any wrinkles. The best method to remove the wrinkles is to glide the iron over the covering until the wrinkles disappear, then go over the area again, pushing down on the iron to bond the covering to the wood. If the wrinkles don't disappear, the balsa in that area might be flexing inward. If this is happening, don't press down. Simply let the heat of the iron shrink the covering. If the wrinkles momentarily disappear, then immediately reappear, the iron may be too hot, thus causing air bubbles. Lower the temperature of the iron or use a sharp #11 blade or T-pin to puncture several holes in the covering, then reheat. The suggested iron temperature is around 360 degrees F.

MOUNT THE AILERON SERVOS

❑ 1. Connect a 6" [152mm] servo extension to one of the aileron servos. Secure the extension to the servo lead with a piece of heat shrink or electrical tape (not included).



❑ 2. Carefully pull the string from the aileron servo opening and tie it to the end of the servo extension.

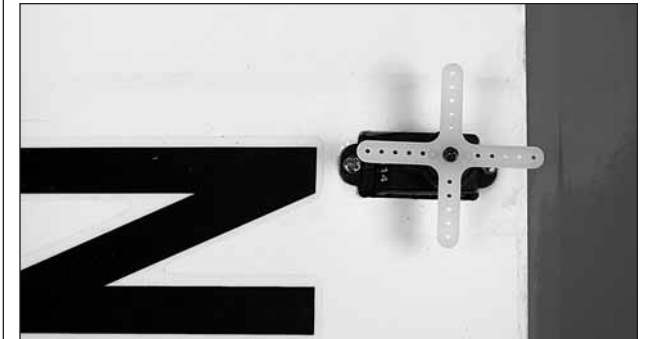


❑ 3. Pull the aileron servo lead through the wing and out of the opening on the top of the wing.

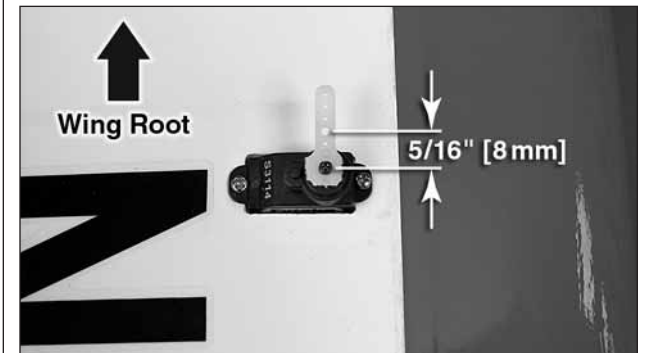


❑ 4. Use a #55 drill bit or small T-pin to drill pilot holes for the servo mounting screws. Mount the aileron in the wing with two #2 x 1/4" [2 x 6mm] sheet metal screws. Remove the screws and servo. Apply a drop

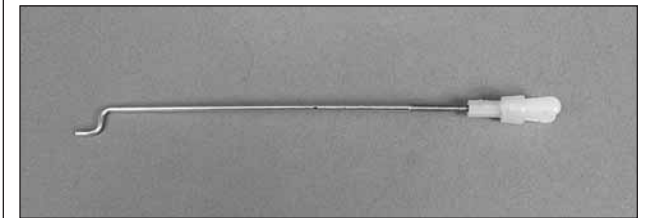
of thin CA in each screw hole. After the CA has cured, reinstall the aileron servo and screws.



❑ 5. Install a servo arm on the aileron servo so that it is perpendicular to the centerline of the servo. Remove the three unused arms.



❑ 6. Use a 1/16" [1.6mm] drill bit to enlarge the hole 5/16" [8mm] from the center of the servo arm.



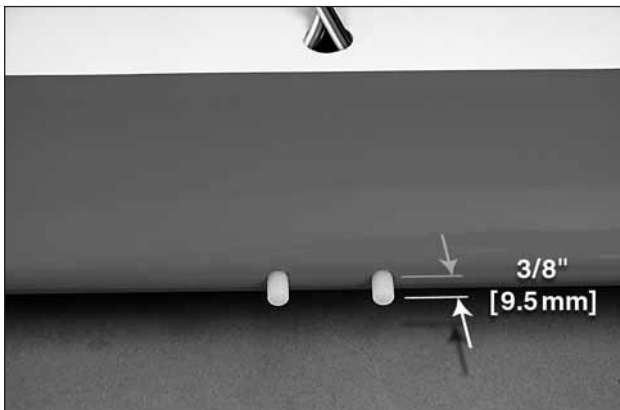
❑ 7. Thread a nylon clevis 20 turns onto the 2-56 x 4-7/16" [110mm] metal pushrod. Slide a silicone clevis keeper over the nylon clevis.

❑ 8. Connect the nylon clevis in the enlarged hole of the servo arm.



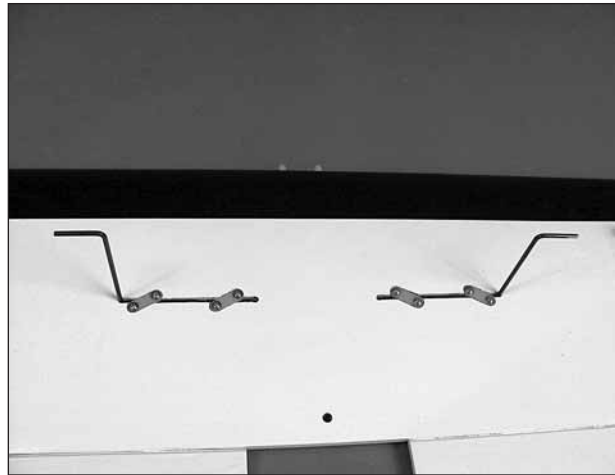
❑ 9. Enlarge the outer hole of the nylon control horn to 5/64" [2mm]. Insert the z-bend of the pushrod in the outer hole of the control horn. Position the pushrod parallel to the servo. Place the control horn on the aileron in line with the pushrod. The four holes in the front of the horn should be aligned with the aileron hinge line. Install the control horn on the aileron with two 2-56 x 3/8" [9.5mm] machine screws and the control horn back plate.

❑ 10. Go back to step 1 and install the other aileron servo following the same procedure. Connect the two aileron servos with a Y-harness.



❑ 11. Use 6-minute epoxy to glue the 3/16" x 15/16" [5 x 24mm] nylon wing dowels in the leading edge of the wing.

INSTALL THE MAIN LANDING GEAR



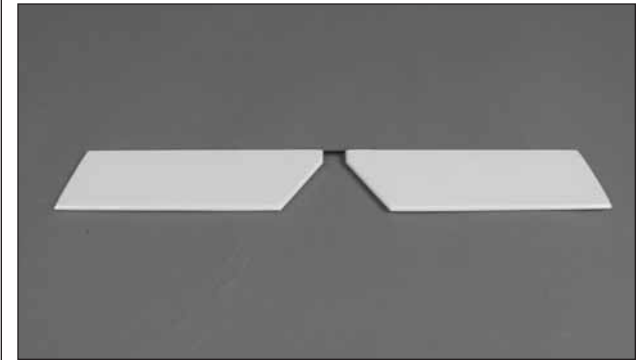
❑ 1. Insert the shorter L-bend of the main landing gear in the bottom of the wing. Secure the main landing gear in the wing with four nylon landing gear straps and eight #2 x 1/2" [12mm] sheet metal screws.



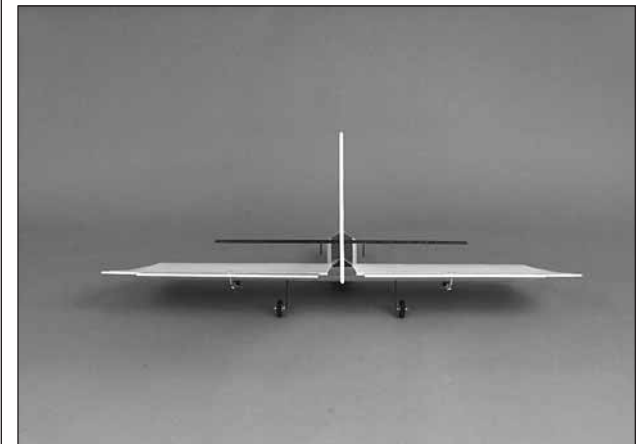
❑ 2. Install a 1/8" [3mm] wheel collar and 4-40 x 1/8" [3mm] machine screw, followed by a 1-7/16" [35mm] foam wheel and a second wheel collar and machine screw. Apply a drop of threadlocker on the threads of the screws before installing. The second machine screw must be tightened on the flat at the end of the main landing gear.

ASSEMBLE THE FUSELAGE

INSTALL THE STABILIZER

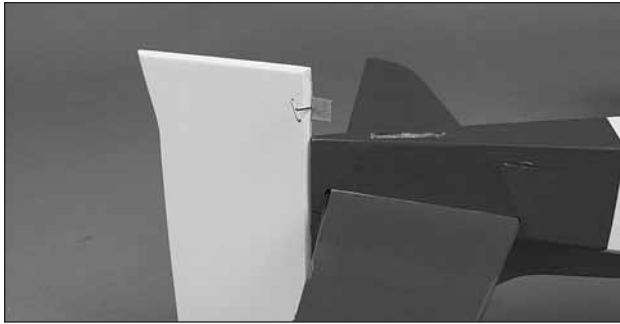


❑ 1. Remove the two elevator halves from the horizontal stabilizer. Insert the elevator joiner wire in the two elevator halves and set the assembly on a flat surface. Check that both elevator halves set flat. If they do not, use a pliers to adjust the elevator joiner wire.

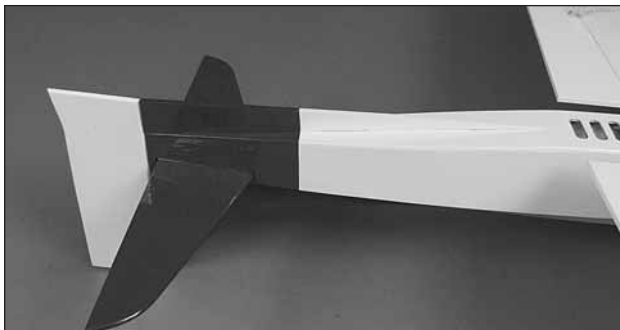


❑ 2. Bolt the wing on the fuselage. Insert the joiner wire in the horizontal stabilizer slot followed by the stabilizer. Insert the vertical fin in the slot on the top of the fuselage. Take a few steps back and view the stabilizer from the back. The stabilizer should be parallel with the wing. If it is not, lightly sand the stabilizer slot until it is parallel.

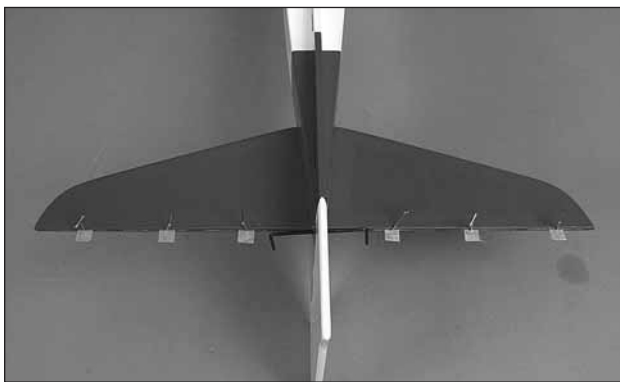
❑ 3. Once you are satisfied with the fit, use epoxy to glue the stabilizer and fin in the fuselage.



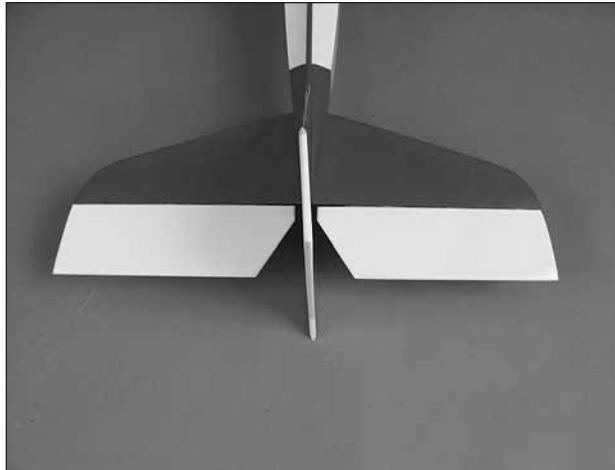
❑ 4. Insert a small T-pin through the center of a CA hinge. Insert the hinge in the bottom leading edge of the rudder.



❑ 5. Insert the CA hinge in the trailing edge of the lower fin. Glue the lower fin to the bottom of the fuselage with thin CA. Remove the T-pin and apply four drops of thin CA to each side of the CA hinge. Allow the CA to wick in after each drop.



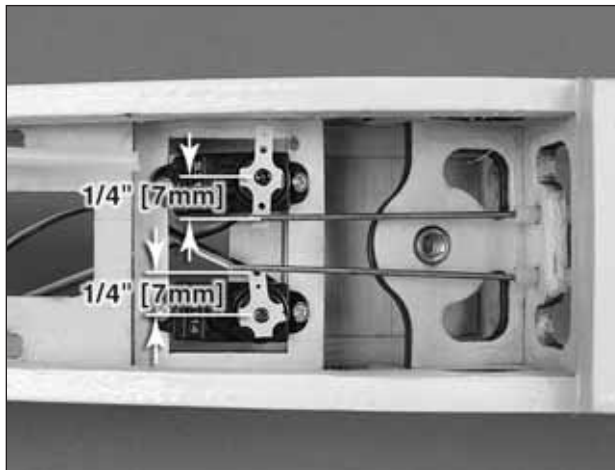
❑ 6. Use T-pins to center six hinges in the trailing edge of the horizontal stabilizer.



❑ 7. Clean the elevator joiner wire with a paper towel dampened with denatured alcohol. Apply 6-minute epoxy in the elevator joiner wire holes of both elevator halves. Install the elevators on the horizontal stabilizer and apply four drops of thin CA to the top and bottom of each CA hinge.

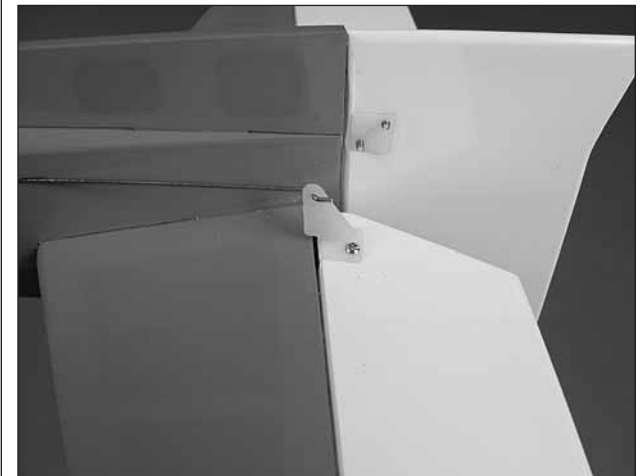
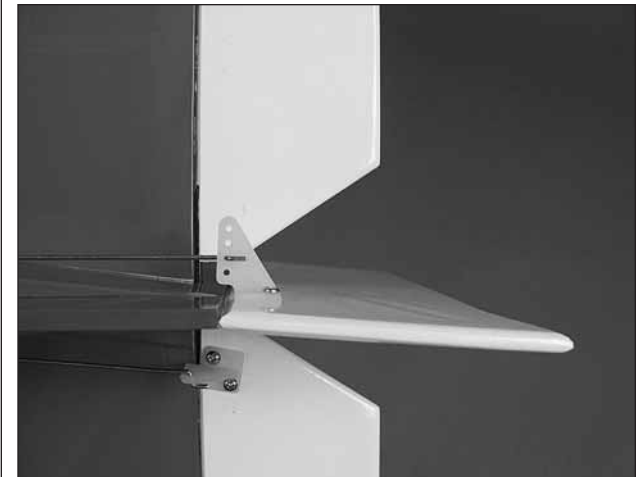
INSTALL THE SERVOS

❑ 1. Connect a 6" [152mm] servo extension to the rudder and elevator servos. Use heat shrink or electrical tape to secure the connection.

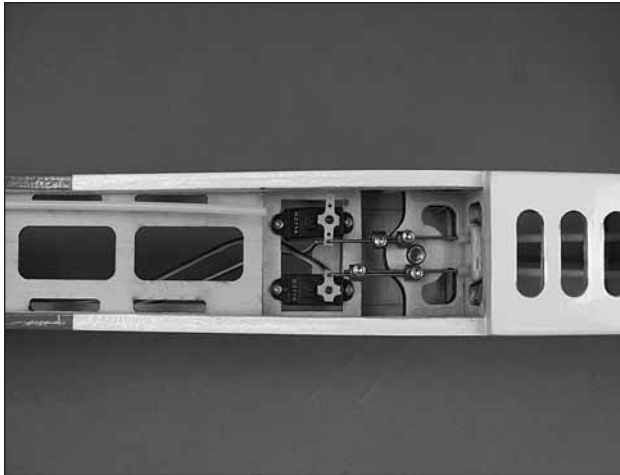


❑ 2. Insert the rudder and elevator servos into the servo tray. Connect the servos to the receiver and

center the servo arms. The rudder needs to have a two arm servo arm for the rudder and the nose steering. Insert the two 17-1/2" [435mm] long metal pushrods in the rudder and elevator outer pushrod tubes. Align the rudder and elevator servos so that the pushrods are aligned with the holes in the servo arms 1/4" [7mm] from the center of the servo. Secure the servos to the servo tray with two #2 x 1/4" [2 x 6mm] sheet metal screws.

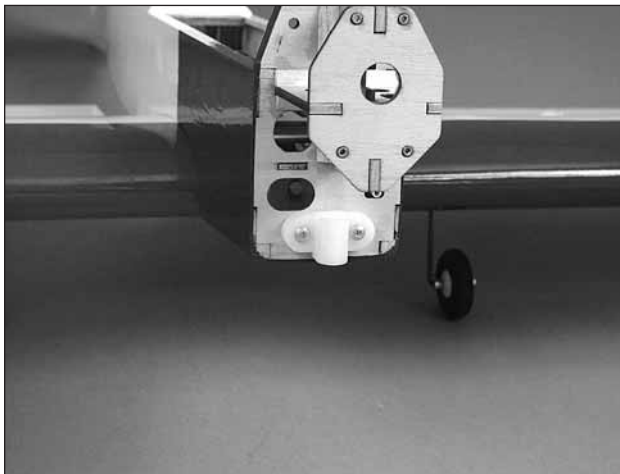


❑ 3. Install the rudder and elevator horns following the same method used to install the aileron horns.



❑ 4. Install the 1-5/8" [40mm] long metal pushrods in the elevator and rudder servo arms. Center the rudder and elevator and secure the pushrods with four 1/8" [3mm] wheel collars and 4-40 x 1/4" [6mm] socket head cap screw. Be sure to use threadlocker on the screw threads.

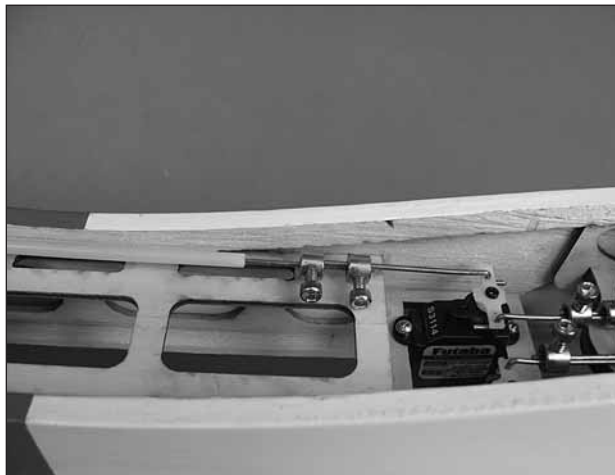
INSTALL THE NOSE GEAR



❑ 1. Apply a drop of threadlocker to the threads of two 4-40 x 3/8" [9.5mm] machine screws. Attach the nylon nose gear block to the front of the firewall with the machine screws.



❑ 2. Slide a 1/8" [3mm] wheel collar and 4-40 x 1/8" [3mm] machine screw onto the nose gear wire. Insert the 9-1/4" [230mm] metal nose gear pushrod into the outer pushrod in the firewall. Slide the nose gear through the nose gear block. Insert the nose gear pushrod in the nylon nose gear steering arm and then slide the nose gear through the steering arm. Secure the steering arm with a 3 x 6 mm socket head cap screw.



❑ 3. Attach the steering pushrod to the rudder servo using the 1-5/8" [40mm] long metal pushrod and two 1/8" [3mm] wheel collars and 4-40 x 1/4" [6mm] socket head cap screws. Note the wheel collars are secured sideways to clear the wing.

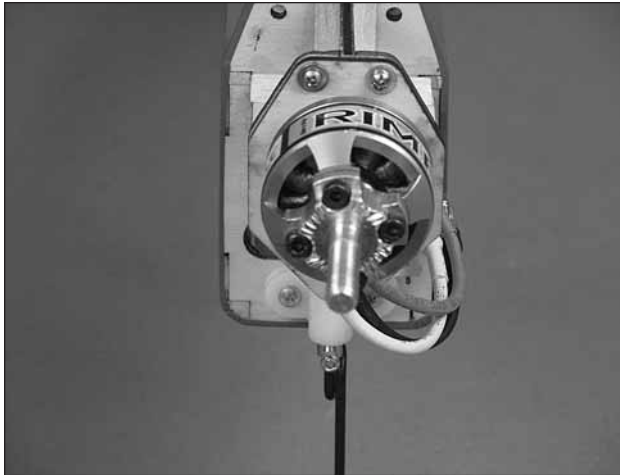


❑ 4. Install the foam nose wheel on the nose gear using two 1/8" [3mm] wheel collars and 4-40 x 1/8" [3mm] machine screws.

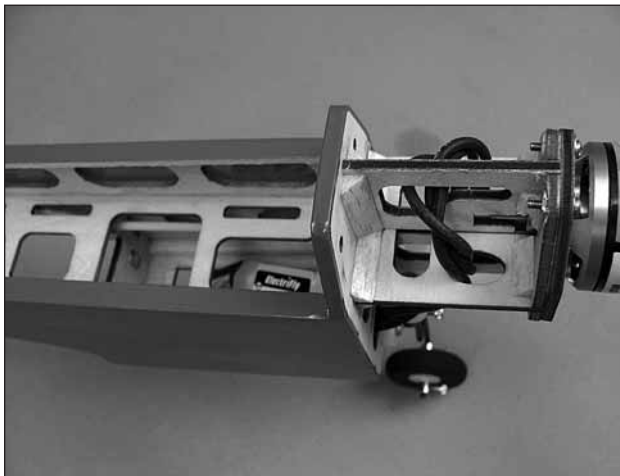
INSTALL THE MOTOR AND ESC



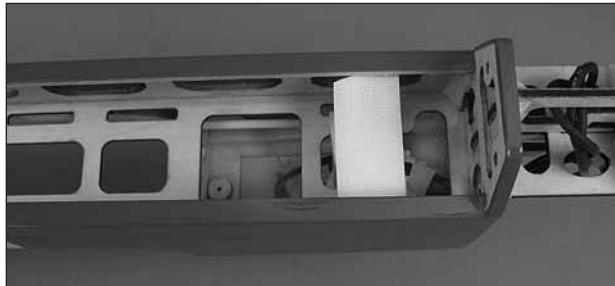
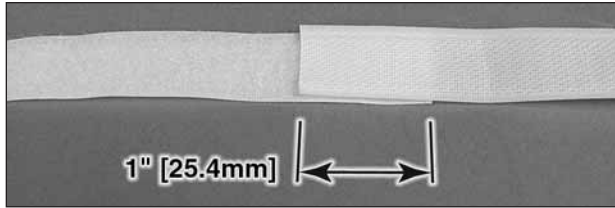
❑ 1. Hold the plywood motor mount up to the front of the fuselage. Notice that the motor mounting holes are offset to the left. This is to account for the right thrust. Attach the motor to the plywood motor mount with four 3 x 6 mm flat head machine screws. Be sure to use threadlocker on the threads.



❑ 2. Mount the plywood motor mount to the front of the fuselage with four 2-56 x 3/8" [10mm] machine screw and #2 flat washers. Apply a drop of threadlocker to the screws before installing.

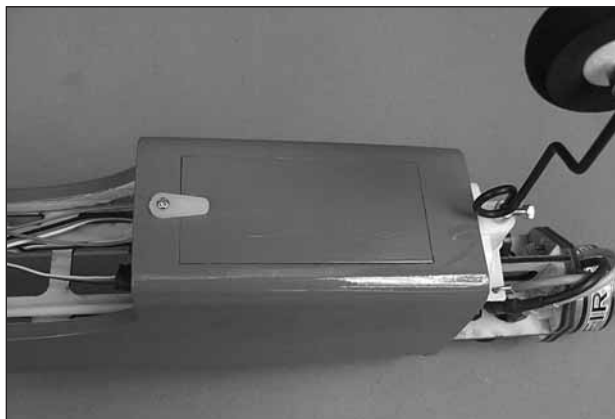


❑ 3. Place the ESC in the ESC/receiver compartment and route the ESC wires out the firewall. Connect the ESC to the motor. See the instructions included with your motor and ESC for operating and safety information.



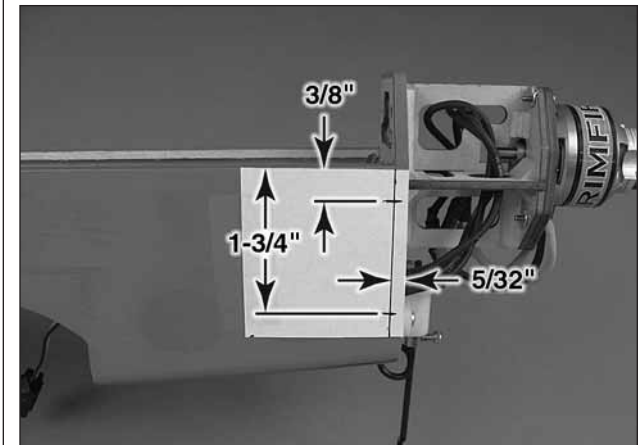
❑ 4. Before you install the receiver in the ESC/receiver compartment, make a battery strap by overlapping the hook and loop material by 1" [25.4mm]. Insert the strap through the forward slots in the battery tray. Temporarily place the motor battery on the battery tray and trim the battery strap to fit.

❑ 5. Route the servo wires to the ESC/receiver compartment. Plug the servos into the receiver and place the receiver in the compartment.

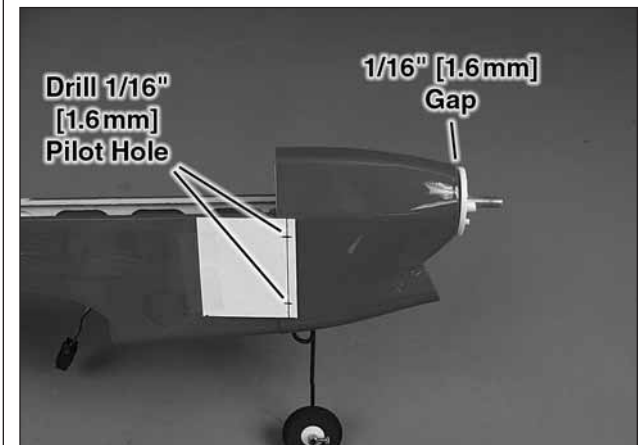


❑ 6. Place the compartment cover on the bottom of the fuselage. Use a #2 x 1/4" [2 x 6mm] sheet metal screw to attach the nylon latch to the bottom of the fuselage. Harden the screw hole with thin CA.

INSTALL THE COWL

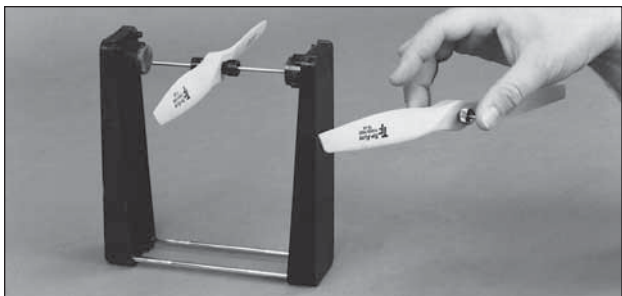


❑ 1. Tape a piece of paper to both sides of the fuselage, even with the firewall. Draw a line 5/32" [4mm] back from the firewall. Place a mark 3/8" [9.5mm] and 1-3/4" [44mm] from the top.



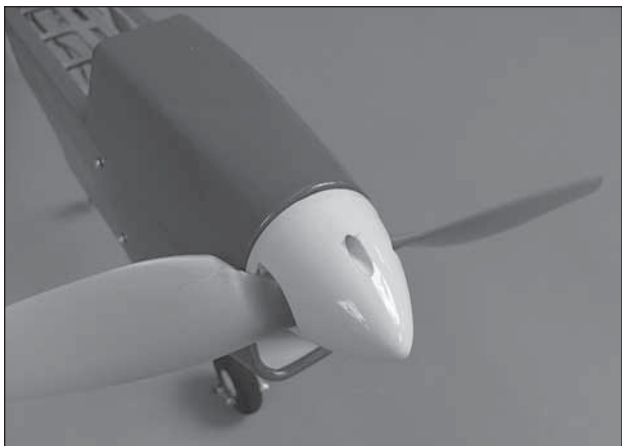
❑ 2. Slide the cowl on the fuselage. Install the spinner backplate and center the backplate on the front of the cowl. Drill 1/16" [1.6 mm] pilot holes through the cowl and fuselage at the marks.

❑ 3. Secure the cowl to the fuselage with four #2 x 1/4" [6mm] sheet metal screws. Harden the screw holes with thin CA.



- ❑ 4. Carefully balance the propeller and any spare propellers. An unbalanced propeller can be the single most significant cause of vibration that can damage the model. Not only will motor mounting screws loosen, possibly with disastrous effect, but vibration may also damage the receiver.

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.



- ❑ 5. Install the spinner and propeller. Secure the spinner cone to the backplate with two 2.5 x 10mm sheet metal screws.

APPLY THE DECALS

- ❑ 1. The decals are die-cut from the factory.
- ❑ 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 1/2 teaspoon of soap per gallon of water. Submerge one of the decals in the solution 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.
- ❑ 5. The recommended pilot will require some trimming to fit in the cowl. We used a piece of scrap wood to make a base on which to mount the pilot.

GET THE MODEL READY TO FLY

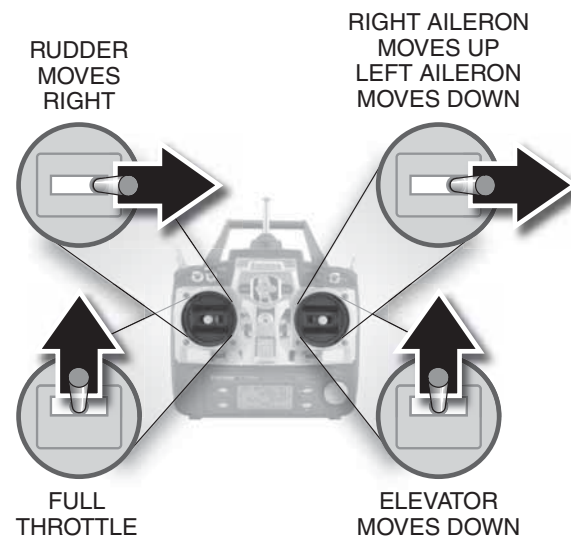
BALANCE THE MODEL Laterally

- ❑ 1. With the wing level, have an assistant help you lift the model by the spinner 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.**

CHECK THE CONTROL DIRECTIONS

- ❑ 1. Switch 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 aileron pushrods and the wheel collars on the elevator and rudder pushrods to center the control surfaces.

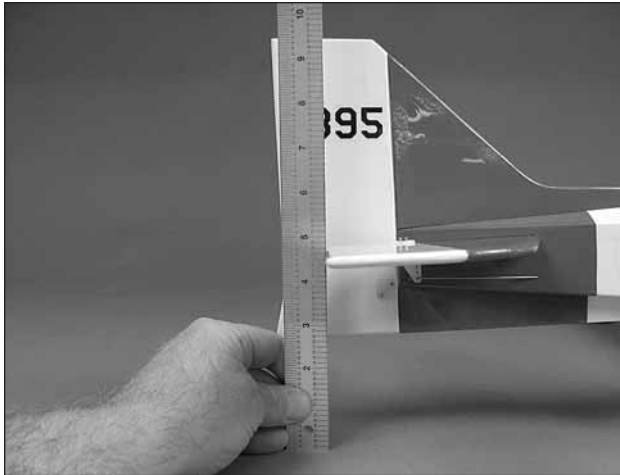
4-CHANNEL RADIO SETUP (STANDARD MODE 2)



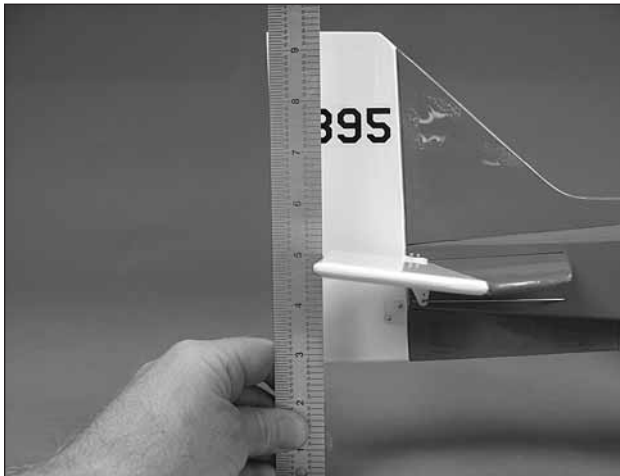
- ❑ 3. Make certain that the control surfaces respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces have remained centered.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

SET THE CONTROL THROWS

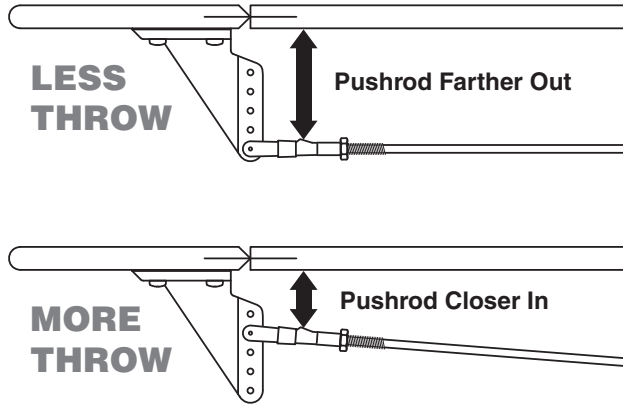
To ensure a successful first flight, set up your Mini Contender EP ARF according to the control throws specified in this manual. The throws have been determined through actual flight testing and accurate record-keeping, allowing the model to perform in the manner in which it was intended. If, after you have become accustomed to the way the Mini Contender EP ARF flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model too responsive and difficult to control, so remember, “more is not always better.”



❑ 1. Hold a ruler vertically on your workbench against the widest part (front to back) of the trailing edge of the elevator. Note the measurement on the ruler.

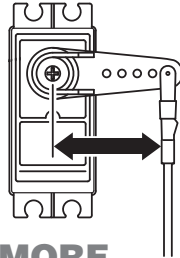


❑ 2. Measure the high rate elevator throw first. Move the elevator up with your transmitter and move the ruler forward so it will remain contacting the trailing edge. The distance the elevator moves up from center is the “up” elevator throw. Measure the down elevator throw the same way.

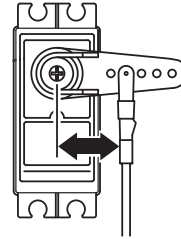


Pushrod Farther Out

Pushrod Closer In



MORE THROW



LESS THROW

❑ 3. 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.

❑ 4. 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.

If your radio does not have dual rates, we recommend setting the throws at the high rate settings.

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

These are the recommended control surface throws:

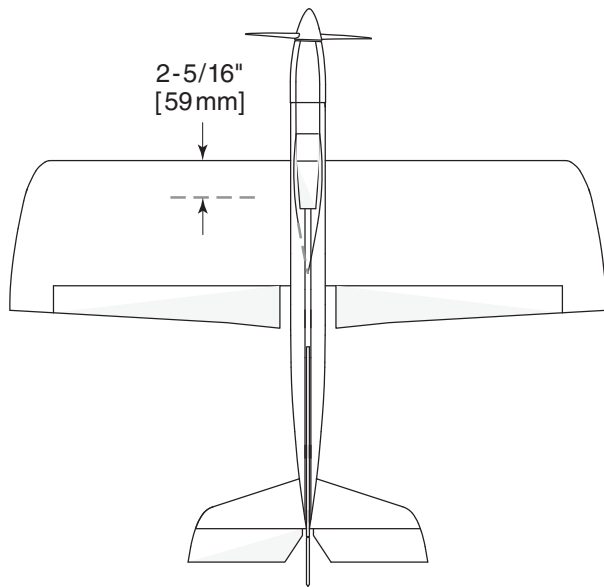
	HIGH RATE	LOW RATE
ELEVATOR	Up and Down 3/8" [10mm] 11°	Up and Down 1/4" [6mm] 7°
RUDDER	Right & Left 1-1/8" [29mm] 22°	Right & Left 3/4" [19mm] 14°
AILERONS	Up and Down 5/8" [16mm] 25°	Up and Down 3/8" [10mm] 14°

Note: The high rate ailerons can be sensitive around center. We recommend that 20% to 30% expo on the high rate ailerons.

BALANCE THE MODEL (C.G.)

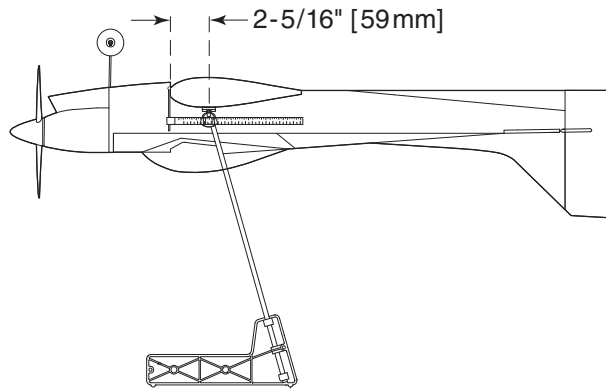
More than any other factor, the C.G. (center of gravity/balance point) can have the greatest effect on how a model flies and could determine whether or not your first flight will be successful. If you value your model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.**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

At this stage the model should be in ready-to-fly condition with **all** of the components in place including the complete radio system, motor battery, propeller, spinner and canopy.



- ❑ 1. If using a Great Planes C.G. Machine, set the rulers to 2-5/16" [59mm]. If not using a C.G. Machine, use a fine-point felt tip pen to mark lines on the top of the wing on both sides of the fuselage 2-5/16" [59mm] back from the leading edge. Apply narrow [1/16" [2mm] strips of tape over the lines so you will be able to feel them when lifting the model with your fingers.

This is where your model should balance for the first flights. Later, you may experiment by shifting the C.G. 1/8" [3mm] forward or 3/16" [4.8mm] back to change the flying characteristics. Moving the C.G. forward will improve the smoothness and stability, but the model will then be less aerobatic (which may be fine for less-experienced pilots). Moving the C.G. aft makes the model more maneuverable and aerobatic for experienced pilots. 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 and all parts of the model installed (ready to fly), place the model upside-down on a Great Planes CG Machine, or lift it upside-down at the balance point you marked.

- ❑ 3. If the tail drops, the model is "tail heavy." If the nose drops, the model is "nose heavy." Move the motor battery forward or aft to balance the plane. If moving the motor battery does not shift the weight enough, use Great Planes "stick-on" lead (GPMQ4485) to balance the plane. To find out how much weight is required, place incrementally increasing amounts of weight on the bottom of the fuselage over the location where it would be mounted inside until the model balances (the horizontal stabilizer is level). A good place to add stick-on nose weight is to the firewall. Do not attach weight to the cowl—this will cause stress on the cowl and could cause the cowl to come off the fuselage. Once you have determined if additional weight needs to be installed, it can be permanently attached.

Do not rely upon the adhesive on the back of the lead weight to permanently hold it in place. Over time, vibration may cause the weight to fall off. Instead, permanently attach the weight with glue or screws.

Note: We have found on our sample models that we were able to balance the plane at its forward and aft C.G. locations by moving the motor battery. No additional weight was required.

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

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 motor battery is securely mounted in the fuse. Make sure the battery straps around the motor battery are tight.
- ❑ 3. If you still fly on 72MHz, extend your receiver antenna and make sure it has a strain relief inside the fuselage to keep tension off the solder joint inside the receiver.
- ❑ 4. Balance your model *laterally* as explained in the instructions.
- ❑ 5. Use threadlocking compound to secure critical fasteners such as the screws that hold the wheels on the landing gear and the motor to the motor mount.
- ❑ 6. Add a drop of oil to the landing gear so the wheels will turn freely.
- ❑ 7. Give the control surfaces a quick tug to make sure all hinges are **securely** glued in place.
- ❑ 8. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl, etc.).
- ❑ 9. Confirm that all controls operate in the correct direction and the throws are set up according to the manual. Checking the direction should be performed

before every flight. With computer radios it is easy to mistakenly change the model.

- 10. Make sure 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 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. Balance your propeller (and spare propellers).
- 14. Check that the spinner screws are tight.
- 15. Place your name, address, AMA number and telephone number on or inside your model. This is an AMA rule.
- 16. If you wish to photograph your model, do so before your first flight.
- 17. Range check your radio when you get to the flying field.

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 15 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 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.

GROUND CHECK AND RANGE CHECK

Always ground check the operational range of your radio before the first flight of the day following the manufacturer’s instructions that came with your radio. This should be done once with the motor off and once with the motor running at various speeds. 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.

MOTOR SAFETY PRECAUTIONS

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

- Get help from an experienced pilot when learning to operate electric motors.
- Use safety glasses when running motors.
- Do not run the motor 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 run the motor.
- Keep these items away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the prop.

- The motor may get hot! Do not touch it right after operation.
- When working on your plane, remove the propeller if the motor battery will be connected.
- Always remove the motor battery from the plane when charging.
- Follow the charging instructions included with your charger for charging LiPo batteries. LiPo batteries can cause serious damage if misused.

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.**

FLYING

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

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 necessary, adjust the nose wheel so the model will roll straight down the runway.

Remember to takeoff into the wind. When you're ready, point the model straight down the runway and gradually advance the throttle. Gain as much speed as your runway and flying site will practically allow before gently applying up elevator, lifting the model into the air. At this moment it is likely that you will need to apply more right rudder to counteract motor torque. Be smooth on the elevator stick, allowing the model to establish a **gentle** climb to a safe altitude before turning into the traffic pattern.

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 Mini Contender EP ARF 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 battery left, practice slow flight and execute practice landing approaches to see how the model handles at slower speeds. Add power to see how she 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 flight time, but use this first flight to become familiar with your model before landing.

LANDING

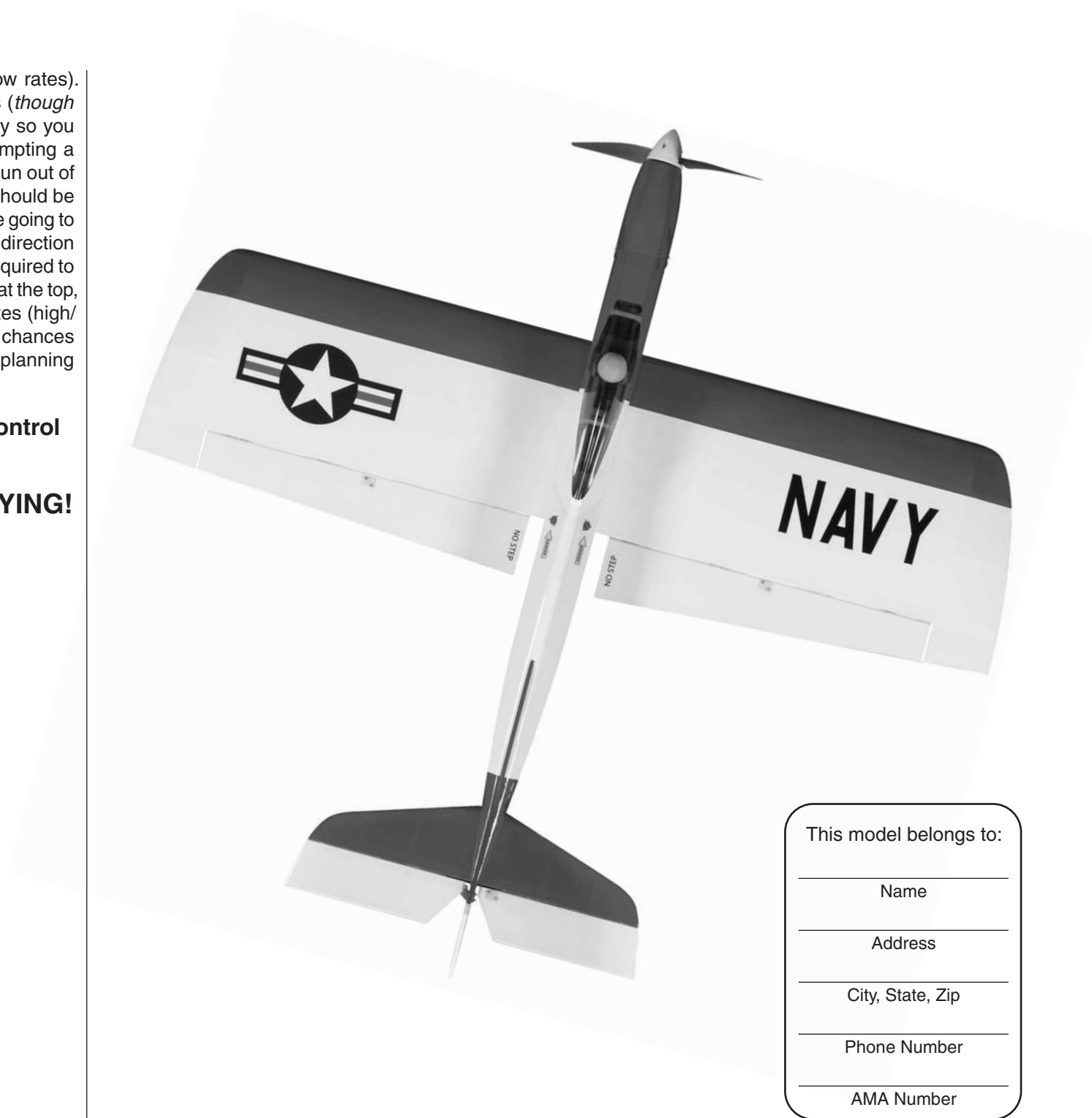
To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (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.

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.**

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

