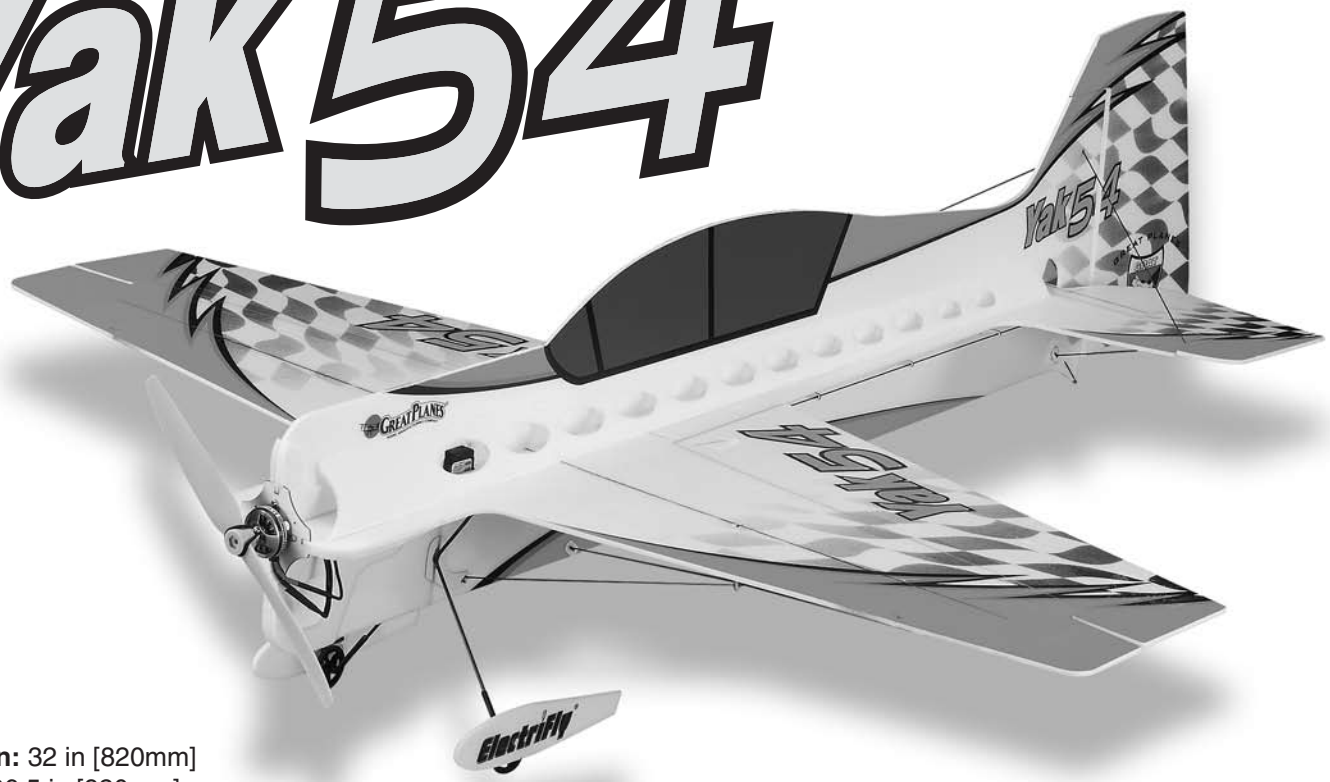
Yak 54

INSTRUCTION MANUAL



Wingspan: 32 in [820mm]
Length: 36.5 in [920mm]
Wing Area: 270 in^2 [17.4dm^2]
Weight: 5.5 – 6.7oz [155-190 g]
Wing Loading: 2.9-3.5 oz/sq ft [9-11 g/dm^2]
Motor: RimFire 250 (28-23-1750) or RimFire 300 (28-22-1380) brushless out-runner motor with Silver Series 8A ESC.
Radio: 4 channel transmitter, 3 micro servos

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

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INTRODUCTION

Congratulations on your purchase of the Great Planes Yak 54 3D Indoor EP ARF! This Yak 54 is a great flying model and is suitable for both indoor and calm day outdoor flying. It's capable of the most extreme 3D maneuvers, but is still a very precise and durable airplane.

For the latest technical updates or manual corrections to the Yak 54 3D Indoor EP ARF visit the Great Planes web site at www.greatplanes.com. Open the "Airplanes" link, then select the Yak 54 3D Indoor 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.

AMA

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
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.

PROTECT YOUR MODEL, YOURSELF & OTHERS.....FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS

1. Your Yak 54 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 Yak 54, 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 motor and components (battery, 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 insure 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 a motor 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.

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 Yak 54 3D Indoor EP ARF that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

Radio Equipment

The Yak 54 3D Indoor EP ARF requires a minimum 4-channel radio system with three micro servos having a rating of at least 20 oz-in [1.5 kg-cm].

In addition, a micro receiver will also be needed. Two different radio setups have been provided below. The lightweight setup utilizes micro Futaba servo connectors. The versatile setup utilizes standard Futaba servo connectors. The part numbers are also provided below:

Lightweight Setup

- ❏ 3 Futaba® S3114M Micro High Torque Servo w/ Micro Plug (FUTM0704)
- ❏ Futaba® R616FFM FASST Micro Receiver (FUTL7626)

OR

Versatile Setup

- ❏ 3 Futaba® S3114 Micro High Torque Servo (FUTM0414)
- ❏ Futaba® R617FS 7-Channel 2.4GHz FASST Receiver (FUTL7627)

Power System Recommendations

The recommended motor size for the Yak 54 is the RimFire 250 (28-23-1750) brushless out-runner motor. The RimFire 300 (28-22-1380) brushless motor would also be a good choice, if you are planning to fly the Yak 54 outdoors.

- ❏ Great Planes Silver Series 8A Brushless ESC 5V/ BEC (GPMM1840)
- ❏ Great Planes RimFire 250 (28-23-1750) Brushless Out-runner Motor (GPMG4502)
- ❏ Great Planes ElectriFly™ LiPo 7.4V 300mAh 20C Competition BP Series (GPMP0700)

OR

- ❏ Great Planes RimFire 300 (28-22-1380) Brushless Out-runner Motor (GPMG4505)
- ❏ Great Planes ElectriFly™ LiPo 11.1V 300mAh 20C Competition BP Series (GPMP0701)

Charger

A LiPo compatable charger is required to charge LiPo batteries. The Great Planes PolyCharge4™ is designed for LiPo packs only; however, it is able to charge four LiPo packs simultaneously. The Great Planes Triton2™ charger will only charge one pack at a time, but is capable of charging NiCd, NiMH, Pb acid, and LiPo batteries. Order numbers for both are provided below:

- ❏ Great Planes PolyCharge4™ DC Only 4 Output LiPo Charger (GPMM3015)

OR

- ❏ Great Planes ElectriFly Triton2™ DC Comp Peak Charger (GPMM3153)

Throughout the life of a LiPo battery, the individual cells located inside the battery may become unbalanced. These unbalanced cells can shorten the life of the battery or cause it to malfunction. For this reason, it is always recommended that a cell balancer be used when charging LiPo batteries. The Electrifly Equinox™ is a cell balancer that may be used with any LiPo charger and is capable of maintaining the cell balance of the battery.

- ❏ Great Planes ElectriFly™ Equinox LiPo Cell Balancer 1-5 (GPMM3160)

ADDITIONAL ITEMS REQUIRED

Required Hardware and Accessories

This is a partial list of the hardware and accessories required to finish the Yak 54. Order numbers are provided in parentheses:

Adhesives and Building Supplies

This is the list of Adhesives and Building Supplies that are required to finish the Yak 54:

- ❏ Foam Safe CA+ Medium Glue 2oz (GPMR6070)
- ❏ 2 oz spray CA activator (GPMR6035)
- ❏ 8 oz Foam Safe Activator Refill 8oz (GPMR6036)
- ❏ Masking tape (TOPR8018)
- ❏ #1 Hobby knife (HCAR0105)
- ❏ #11 blades (5-pack, HCAR0211)
- ❏ Hobbico Soldering Iron 30 Watt (HCAR0775)

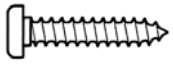
Optional Supplies and Tools

Here is a list of optional tools that will help you build the Yak 54:

- ❏ Threadlocker thread locking cement (GPMR6060)
- ❏ CA applicator tips (HCAR3780)
- ❏ CA debonder (GPMR6039)
- ❏ Pliers with wire cutter (HCAR0630)
- ❏ Hobbico Duster™ can of compressed air (HCAR5500)
- ❏ Precision Magnetic Prop Balancer (TOPQ5700)
- ❏ Hobbico Flexible 18" Ruler Stainless Steel (HCAR0460)
- ❏ Hobbico Pin Vise 1/16 Collet w/6 Bits (HCAR0696)
- ❏ Great Planes Pro™ CA Glue Thin 1oz (GPMR6002)
- ❏ X-Acto® Extra Hands Double Clip (XACR4214)

IMPORTANT BUILDING NOTES

- Self-tapping screws are designated by a number and a length. For example, #6 x 3/4" [19mm].



- 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 use foam safe CA glue.
- **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 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.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.

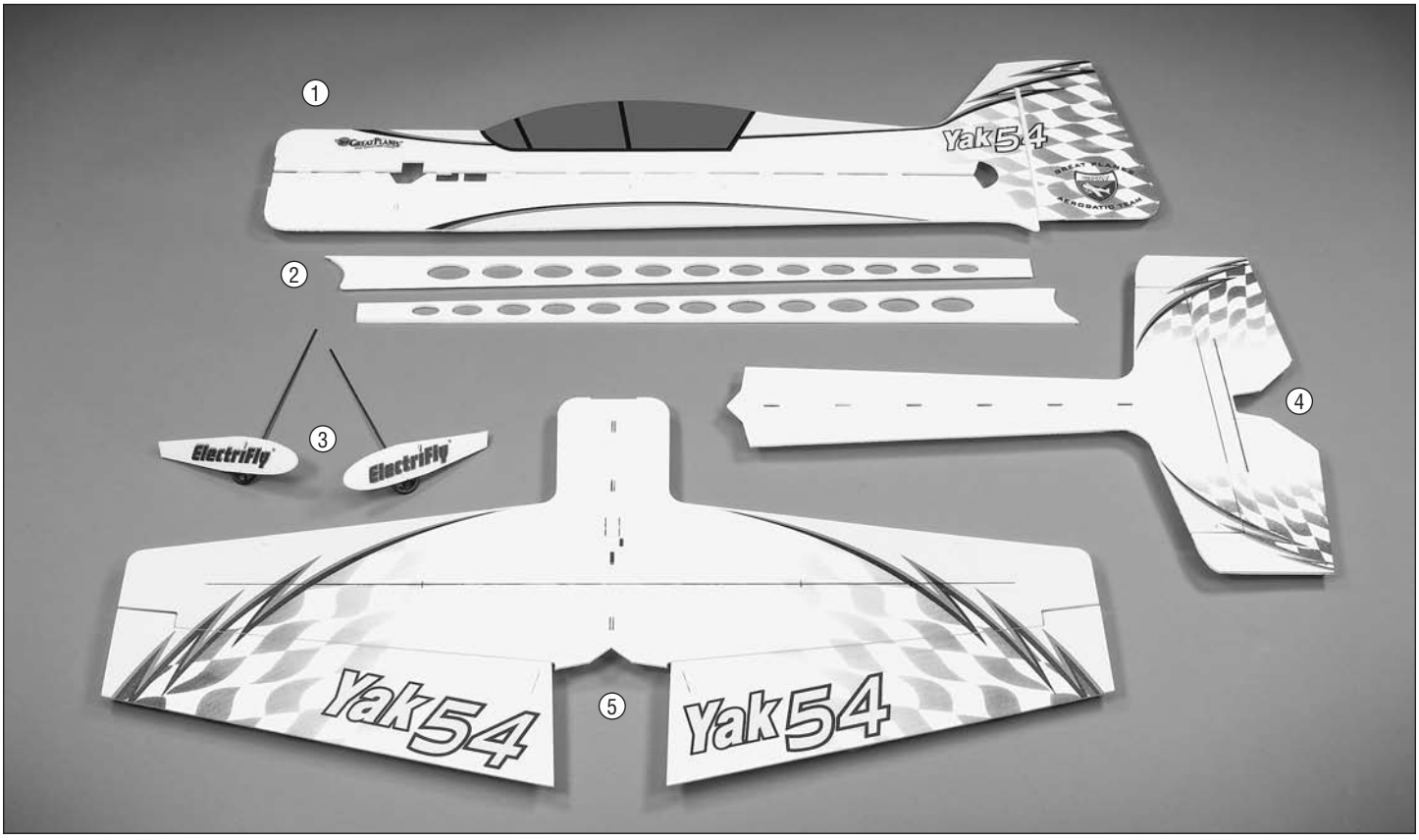
KIT INSPECTION

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
Champaign, IL 61822

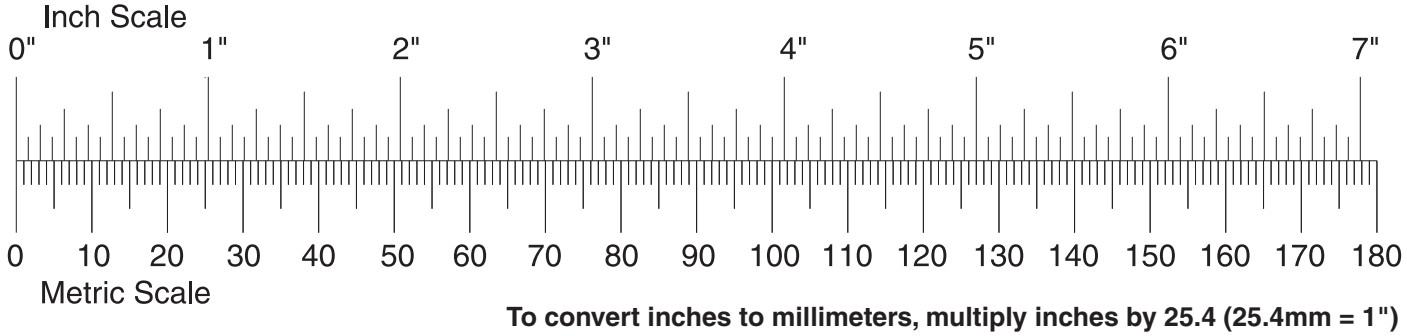
Telephone: (217) 398-8970, ext. 5
Fax: (217) 398-7721
E-mail: airsupport@greatplanes.com

KIT CONTENTS



Kit Contents

1. Vertical fuselage and rudder
2. Fuselage stringers
3. Landing gear assembly
4. Aft horizontal fuselage
5. Forward horizontal fuselage and wing

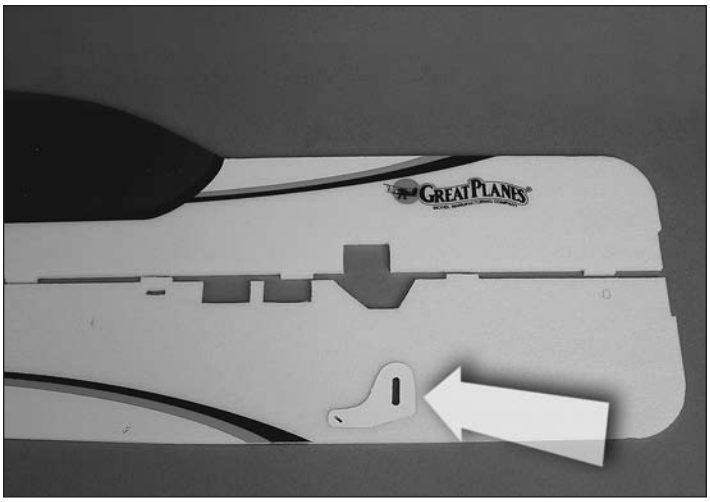


To convert inches to millimeters, multiply inches by 25.4 (25.4mm = 1")

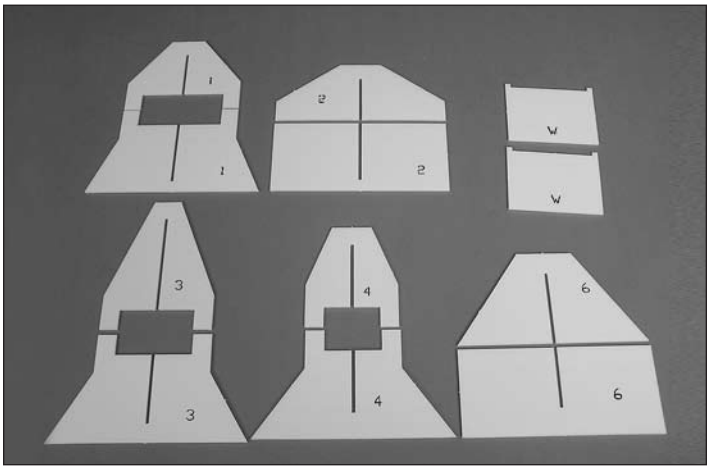
PREPARATIONS

❏ 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 4.

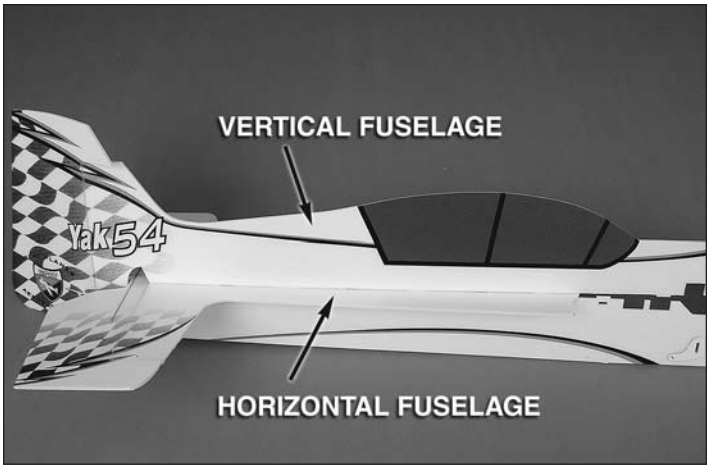
BUILD THE FUSELAGE

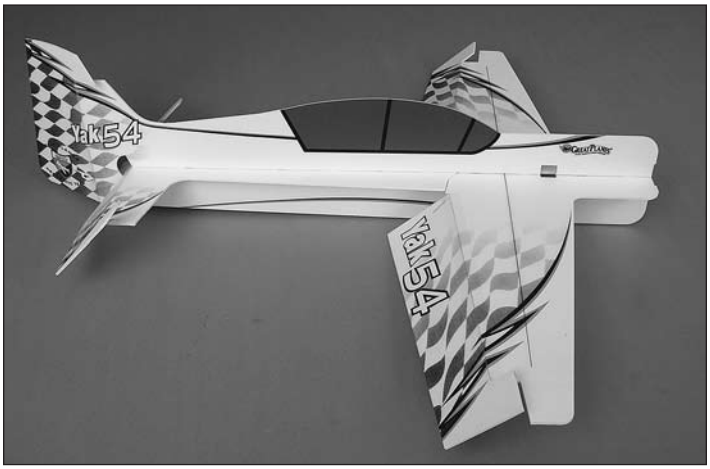


❏ 1. Locate the two ABS landing gear stiffeners. Glue a landing gear stiffener to each side of the fuselage in the location shown.

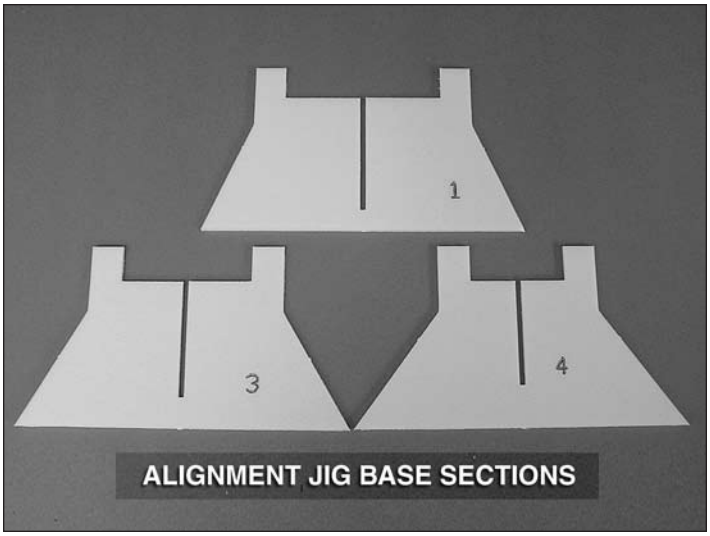


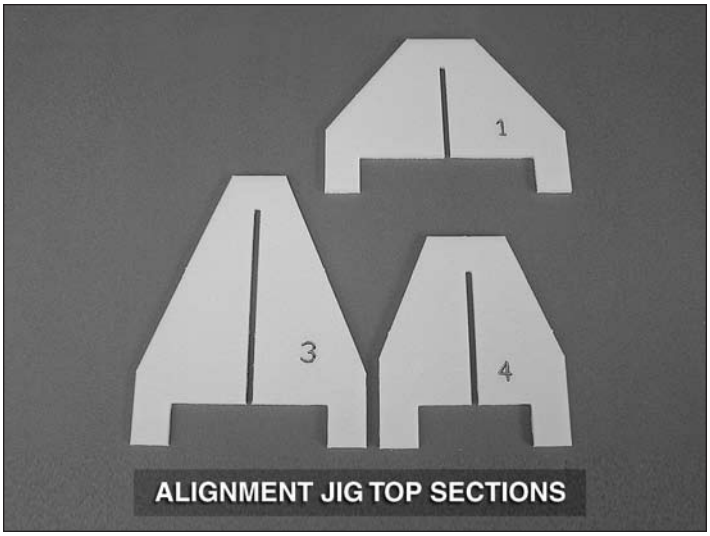
❏ 2. Remove the twelve fuselage alignment jig pieces from their surrounding foam. Note: These pieces are labeled 1,2,3,4,6, and W. There are no pieces labeled 5.

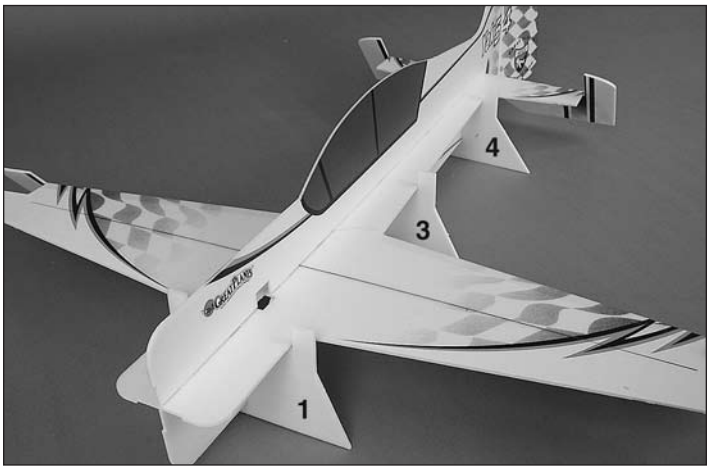


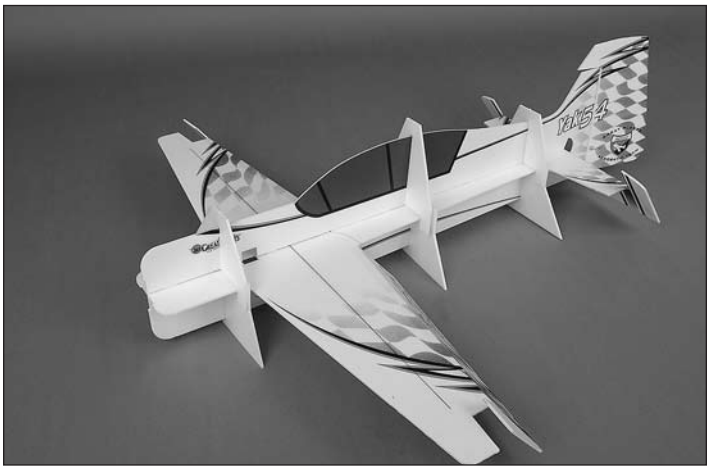


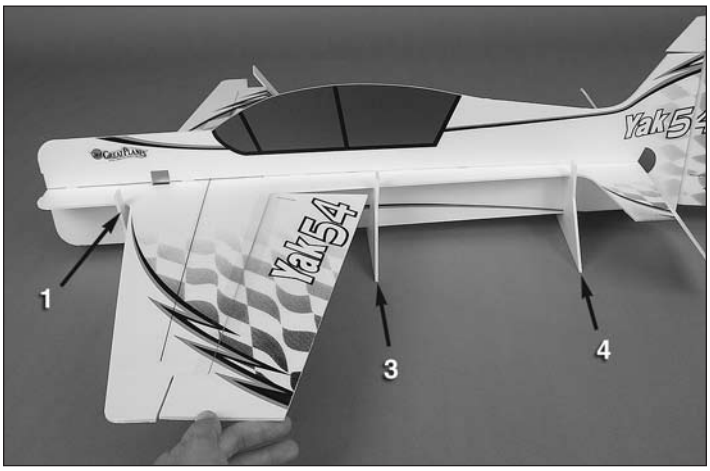
❏ 3. Key the rear of the horizontal fuselage into the vertical fuselage. Then key the wing portion into the vertical fuselage.

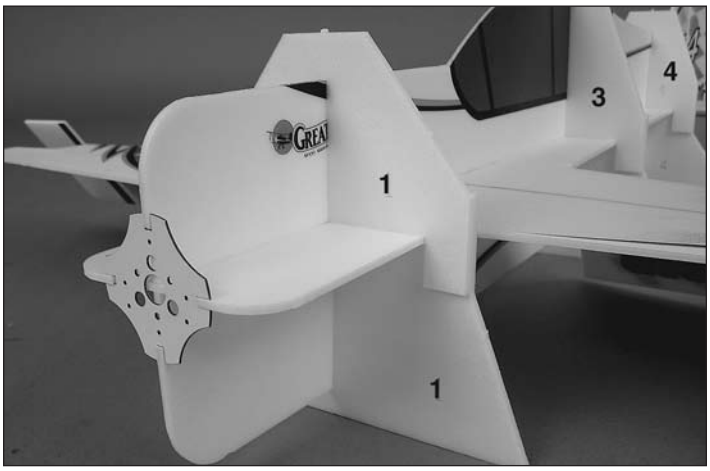






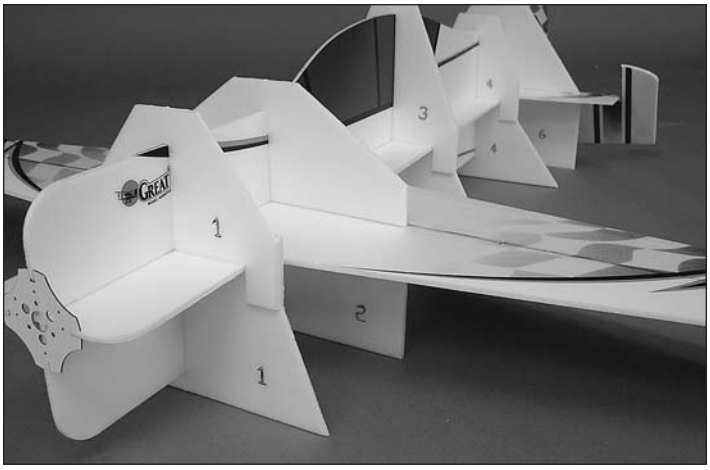


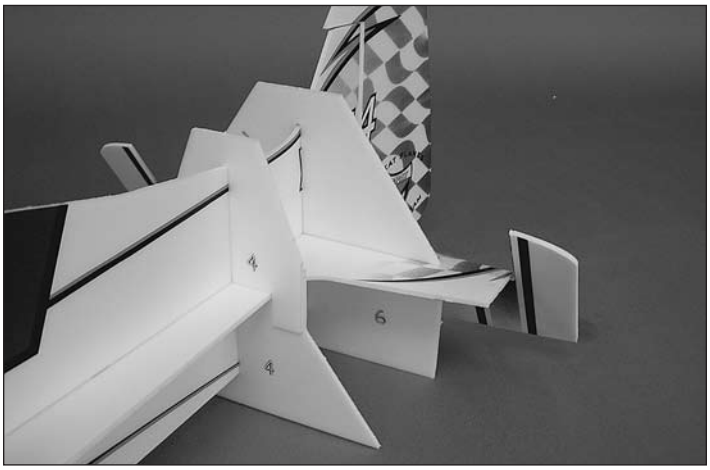




❏ 4. On a flat, level work surface, place the base sections of alignment jig pieces number 1,3, and 4 underneath the fuselage in the locations shown.

❏ 5. Test fit the top sections of the alignment jig pieces onto their corresponding bases. Install the motor mount onto the front of the firewall, but **DO NOT** glue it in place at this time. Connect the top portions of the jig pieces to their bases by applying a small amount of foam safe CA glue to the tabs that overlap. **Be very careful to not glue the jig pieces to the fuselage.**



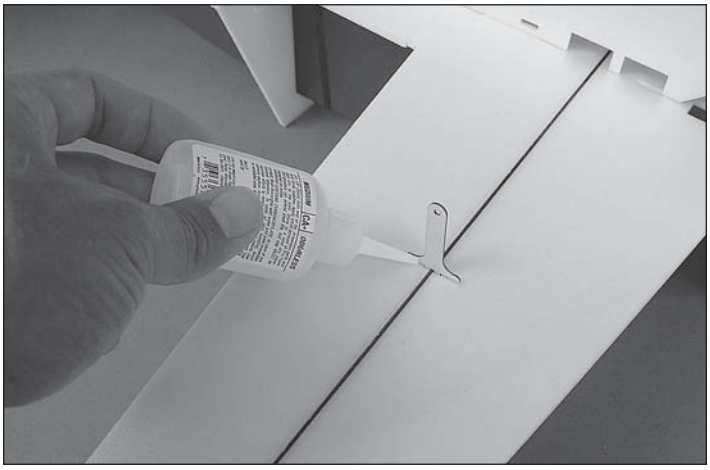


❏ 6. Place the base section of jig piece 2 under the wing, and place base jig piece 6 under the horizontal stabilizer. Slide the corresponding top sections over the fuse, as pictured.

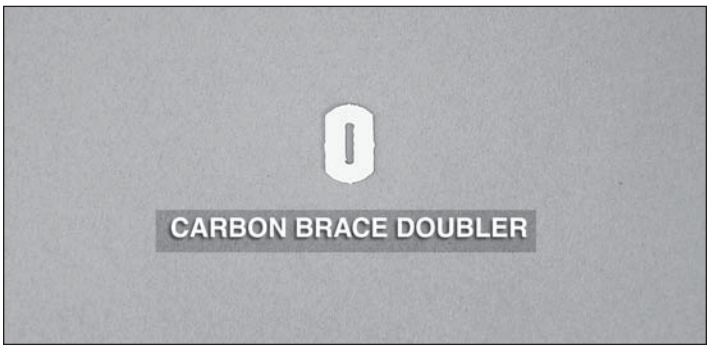
❏ 7. Glue the two fuselage pieces together by gently sliding the vertical fuselage and applying foam safe CA glue to the seam between the two fuselage pieces. Be very careful when gluing around the jig pieces. **DO NOT** glue the jig pieces to the fuselage. Apply some foam safe accelerator to the seam, and allow a few moments for the glue to cure.

❏ 8. Apply a thin bead of foam safe CA glue to the opposite side of the fuselage, and to the seam behind the wing. Activate this CA and allow a few moments for the glue to cure.

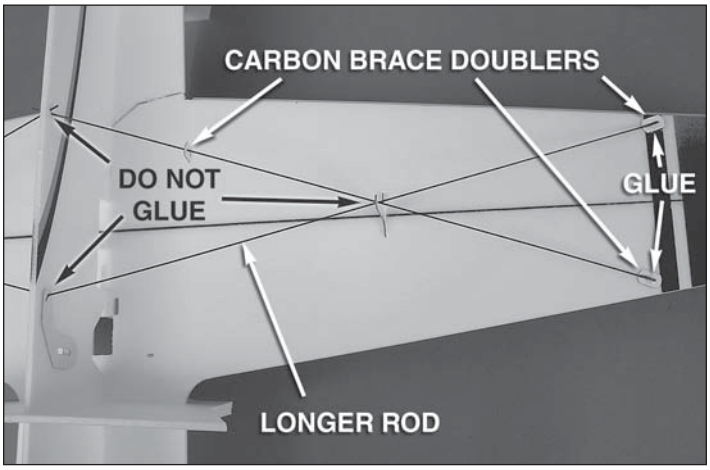
❏ 9. Once the glue has cured, gently turn the Yak over and apply glue to the underside fuselage seams.



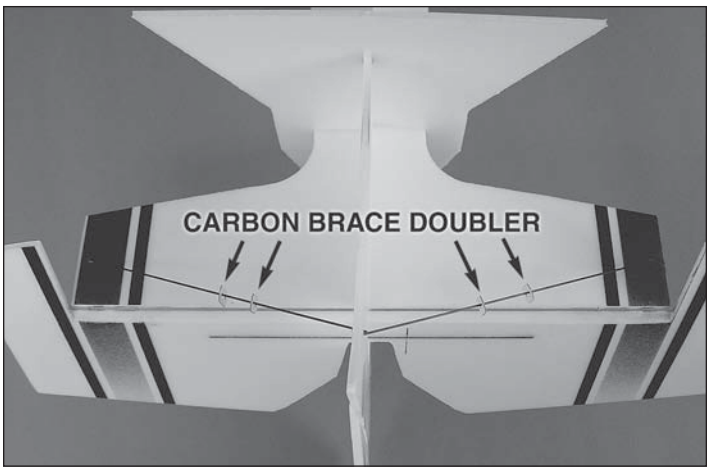
❏ 10. Locate the two carbon brace supports. There is a slit located in the center of each wing. With the Yak on its back, glue the carbon brace supports into the slits on the underside of the wing. It is possible that, during manufacturing, some glue has gotten into the slit. If this is the case, **DO NOT FORCE** the carbon brace support into the slit. Simply clear the glue with a hobby knife.



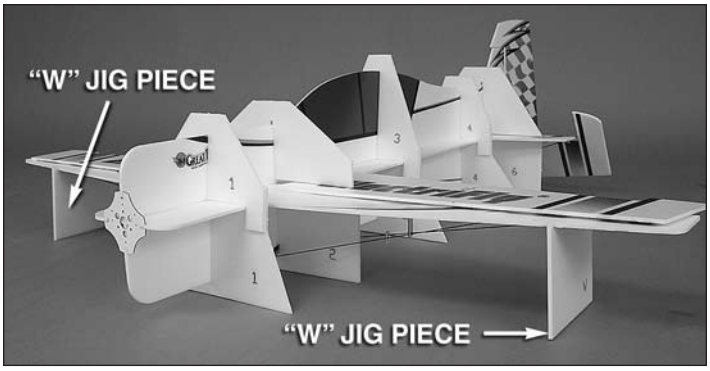
❏ 11. Locate the two 13-7/16" x 3/64" [340 x 1mm] carbon rods, and two 13" x 3/64" [330 x 1mm] carbon rods. Insert a 13-7/16" [340mm] rod through the landing gear plate and through the carbon brace support. Thread a plastic carbon brace doubler onto the carbon rod. Place the end of the carbon rod into the slit at the trailing edge of the wing. Glue the carbon rod into the wing. Slide the carbon brace doubler over the slit, and glue it to the wing. **DO NOT glue the carbon to the fuselage at this time.** Repeat this step for the other side of the wing.

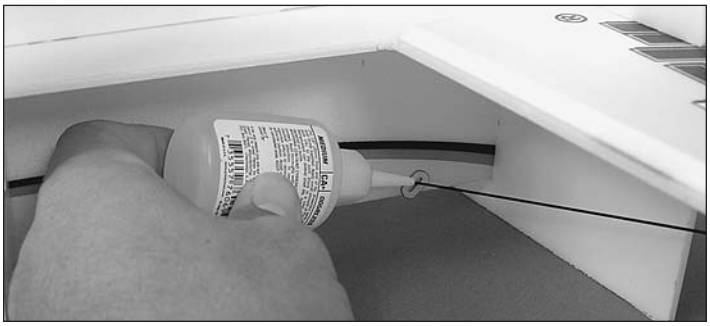


❏ 12. Slide the 13" [330mm] carbon rod through the aft fuselage slit. Thread a carbon brace doubler onto the rod and thread the rod through the carbon brace support. Thread a second carbon brace doubler onto the rod, and place the carbon rod into the slit located close to the wing leading edge. Glue the carbon rod into the wing. Slide the carbon brace doubler over the slit, and glue it to the wing. **DO NOT glue the carbon to the fuselage or to the brace support at this time.** Repeat this step for the other side of the wing.

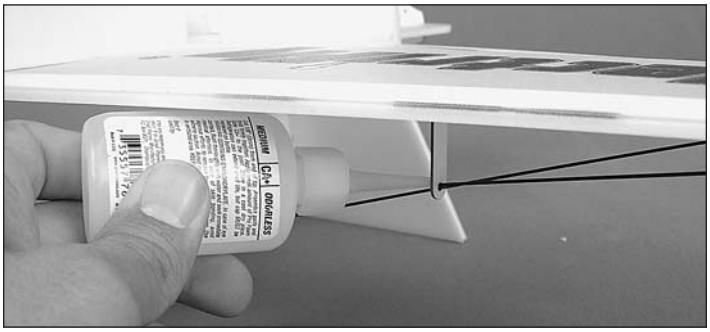


❏ 13. Locate the two 6-3/16" [157mm]carbon rods. Thread two carbon brace doublers onto the rods. Place one end of each rod into the slot on the fuselage and the other end of the rod into the slot at the tip of the horizontal stabilizer. Glue the rod to the horizontal stabilizer. Slide one of the carbon brace doublers over the slit and glue it to the stabilizer. **DO NOT glue the carbon to the fuselage at this time.**



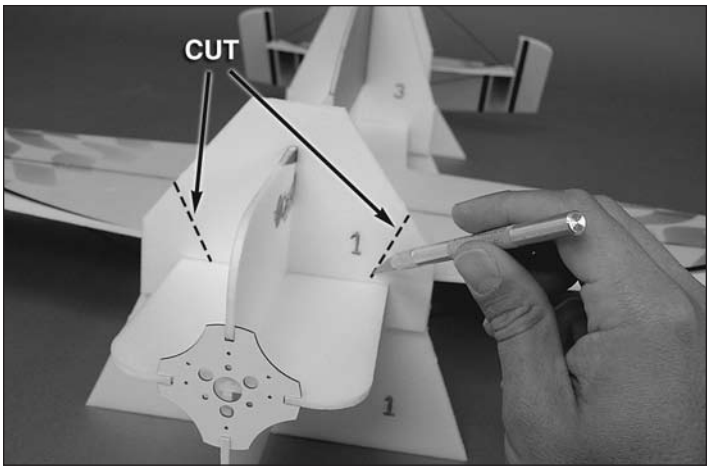


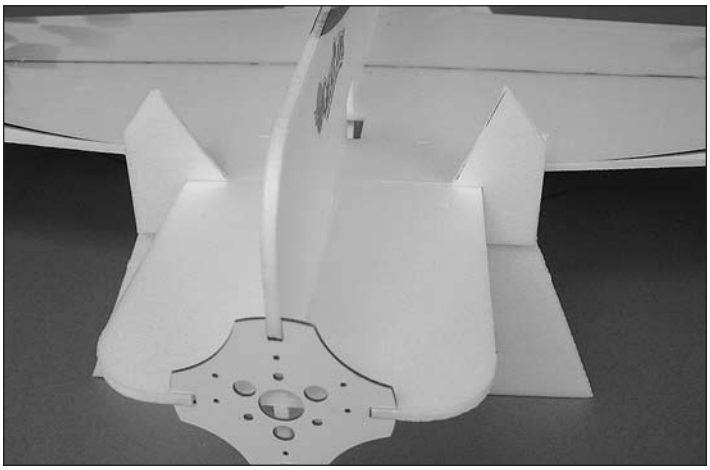
❏ 14. Turn the Yak back, right side up. Locate the two jig pieces marked with a "W" and place them under the wings in the location shown. With all the jig pieces in place, adjust the carbon rods, if necessary, to be certain the wing and horizontal stabilizer are level and straight. Once the wings and stab are aligned, glue the carbon rods to the fuselage, and glue the carbon brace doublers over the slits in the fuselage.



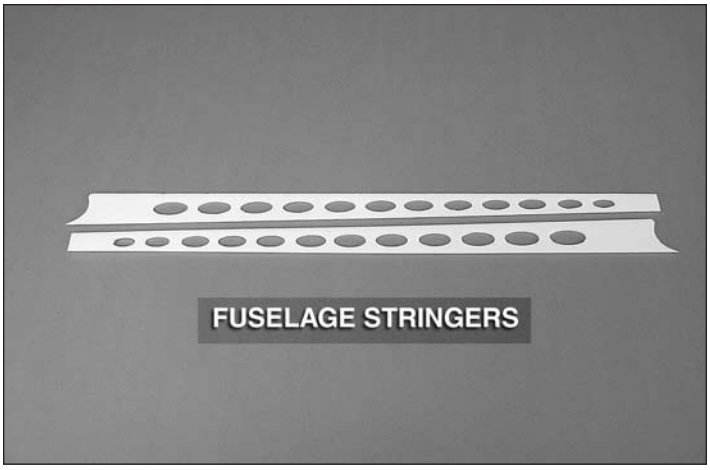
❏ 15. Allow a few moments for the glue to cure and then glue the carbon rods in the wing to the carbon brace supports.

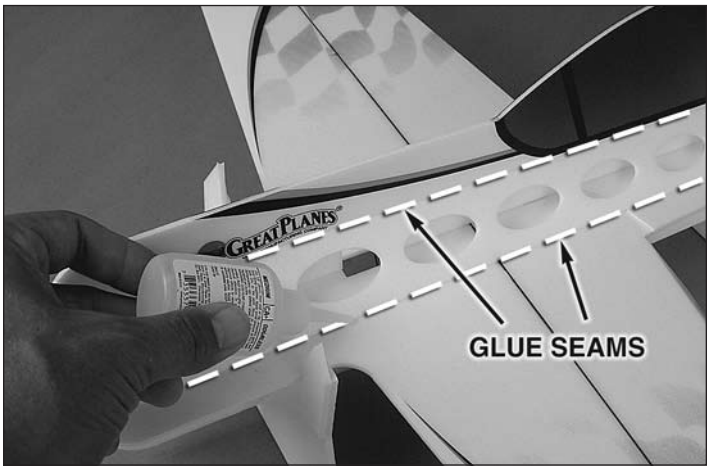
❏ 16. Locate the two 7" [178mm] carbon rods. Slide these carbon rods through the slit in the top of the vertical stabilizer and into the slit at either tip of the horizontal stabilizer. Double check the alignment of the vertical stabilizer and then glue the carbon rods in place.



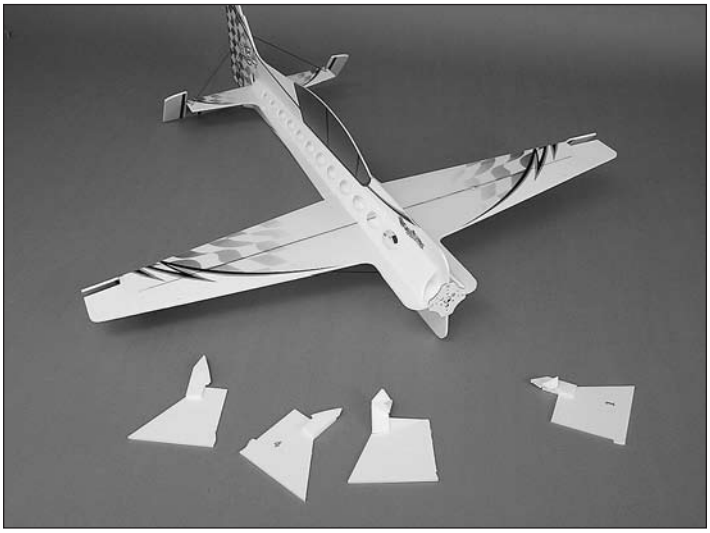


❏ 17. Using a hobby knife, remove the top portion of assembly jig pieces 1, 2, and 4 that are close to the fuselage, as shown. There should still be a small amount of the top pieces left, to keep the jig attached to the fuselage.



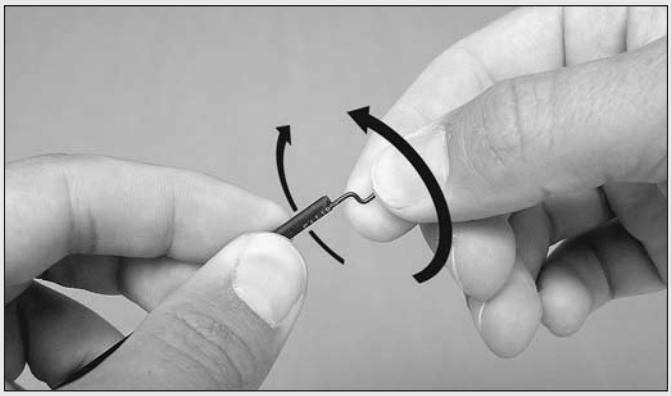


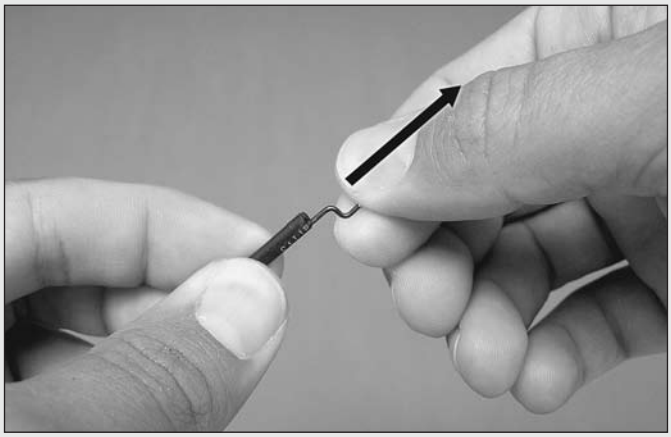
❏ 18. Locate the two fuselage stringers. Very gently, so as to not twist the fuselage, glue the stringer at a 45 degree angle to the sides of the fuselage by applying a small amount of glue to the beveled portion of the stringers. Once the glue has had time to cure, reinforce the stringers by applying glue to the seam between the stringers and the fuse halves.

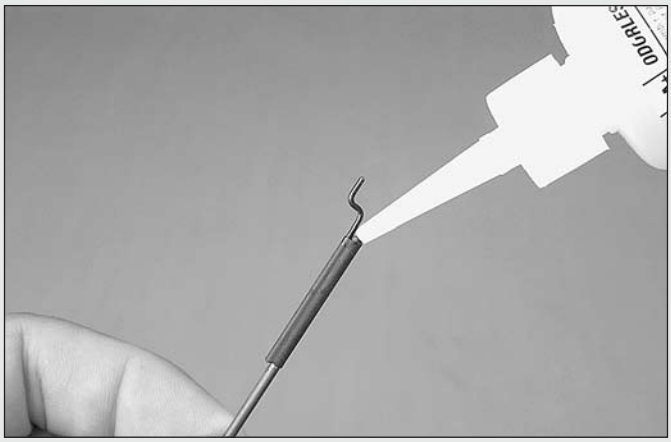


❏ 19. At this point double check to make sure the motor mount is in the center of the airframe, and then glue it into position. Carefully remove the bottom pieces of the build jig by cutting or breaking them.

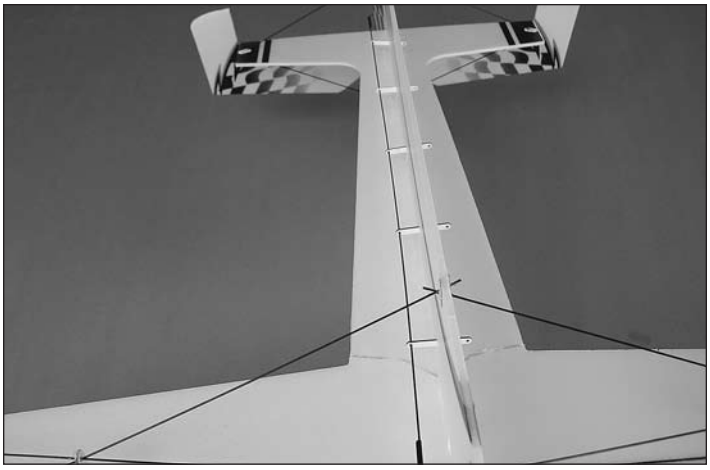
INSTALL THE SERVOS AND PUSHRODS



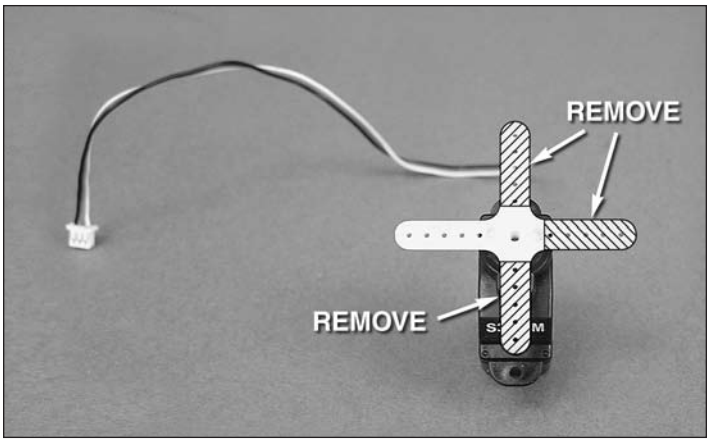




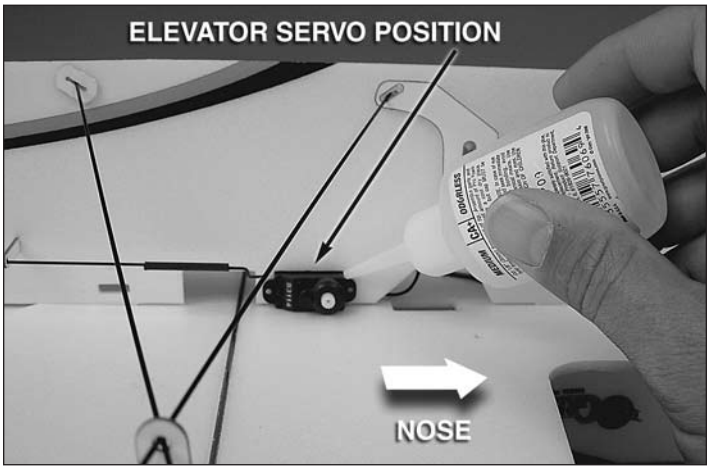
For your convenience, the aileron and elevator pushrods have been pre-assembled. If you are not using Futaba S3114 servos, or due to manufacturing tolerances, it may be necessary to change the pushrod length. This may be done by holding the heat shrink tubing that connects the pushrod to the z-bend and gently rotating the z-bend until the glue holding the z-bend in place has broken loose. Then adjust the length by pulling or pushing the z-bend until the appropriate length is achieved, and re-glue the z-bend to the pushrod using some CA glue.



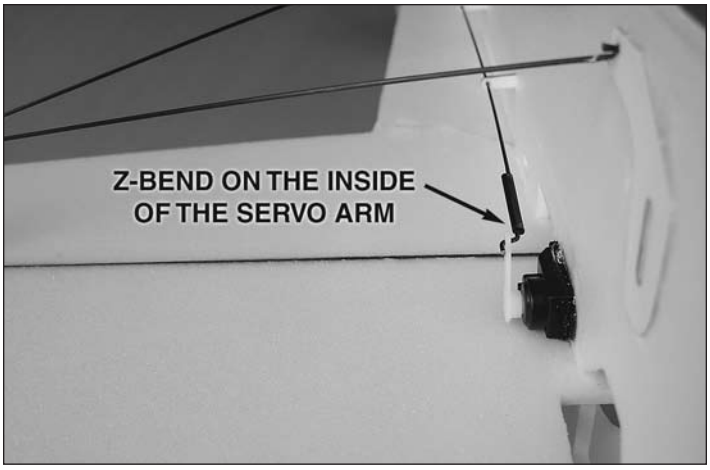
❏ 1. Install the pre-assembled elevator pushrod by inserting the pushrod guides through the fuselage as shown. **DO NOT** glue the pushrod guides in place at this time.



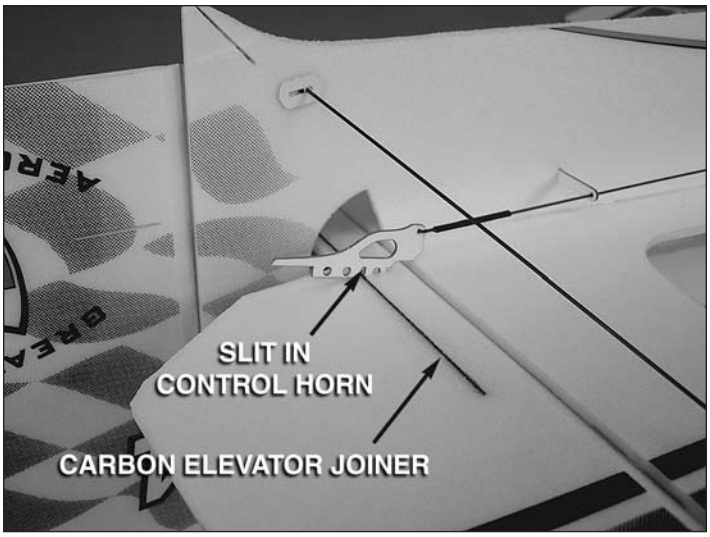
❏ 2. Locate your elevator servo. Remove the servo screw from the servo output shaft. Install the larger arm onto the servo. Center the servo using your radio and, using some diagonal pliers, remove the three extra servo arms.

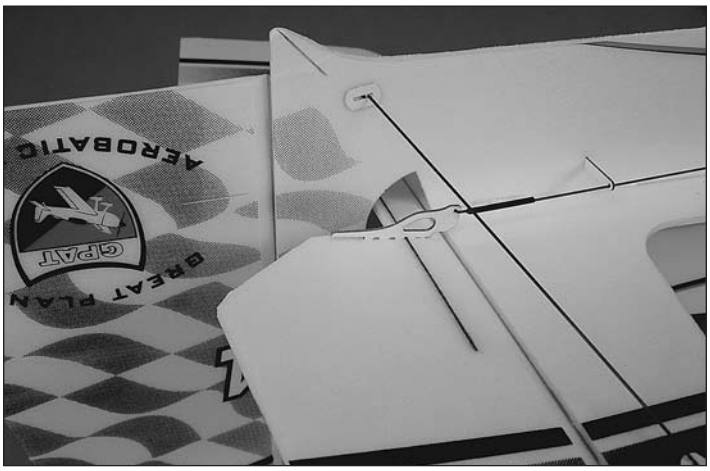


❏ 3. Install the elevator servo, without the servo arm, by placing it into the middle servo mount in the fuselage, with the output shaft on the forward side as shown. **NOTE:** Pay carefull attention to the servo position in this picture. Glue the servo in place using some foam-safe CA glue. Be careful to not get any glue inside the servo case. This could ruin your servo.

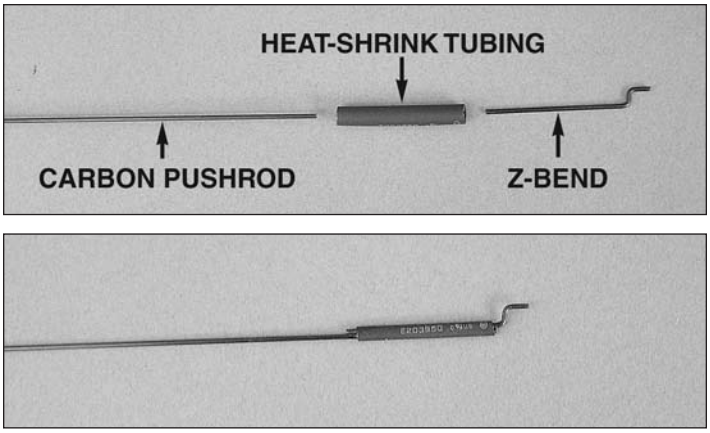


❏ 4. Thread the z-bend onto the outer most hole of the servo arm. **Note:** If you are not using a computer radio, and do not wish to set your model up with 3D control throws, you may choose the hole that is most appropriate. When the servo arm is installed correctly the pushrod will exit closest to the fuselage, as shown. Finish the elevator servo installation by centering the servo, placing the servo arm onto the servo, and reinstalling the servo screw.

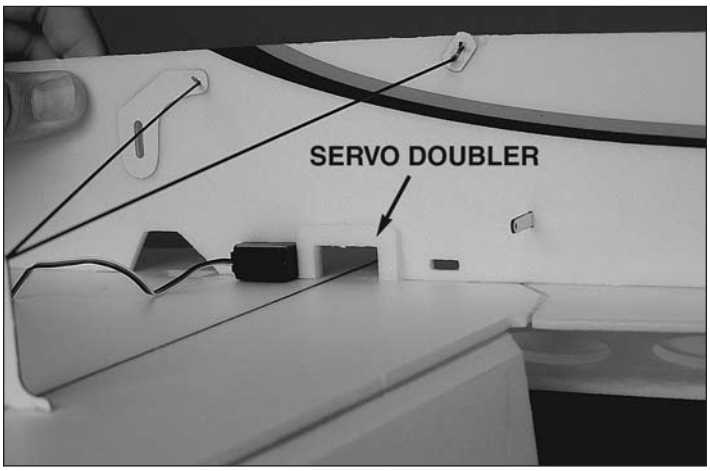




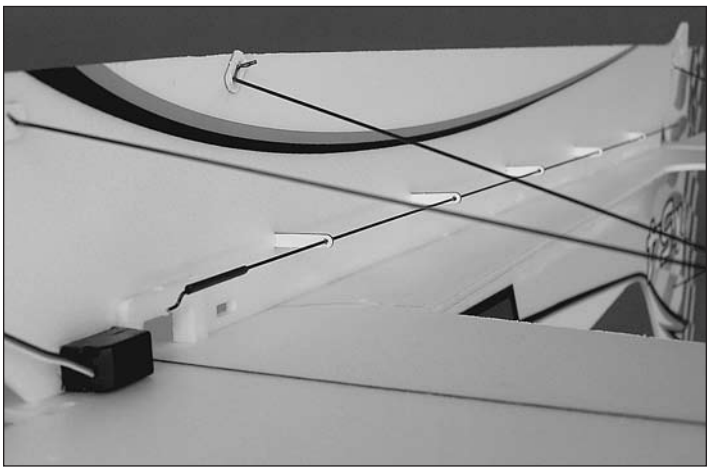
❏ 5. Install the elevator control horn by first threading it onto the z-bend at the end of the elevator pushrod. Then place some foam safe CA glue onto the base of the control horn. Insert the pushrod into the slit in the elevator. The slit in the control horn should fit over the carbon elevator joiner. If the control horn will not fit over the carbon joiner, simply remove the excess glue from the slit to achieve a snug fit.



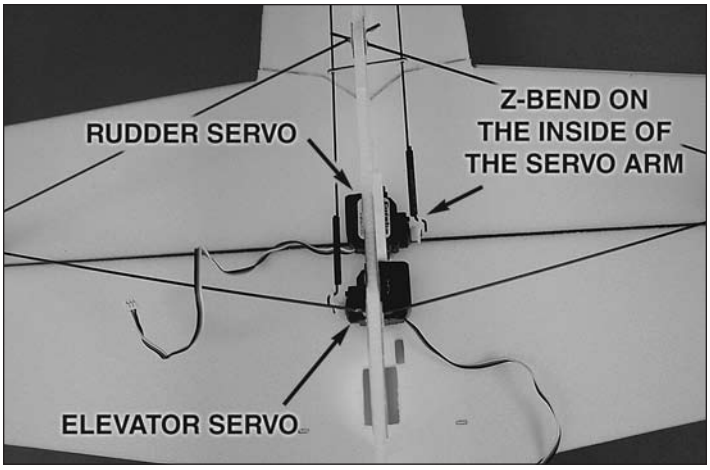
❏ 6. Attach one of the included z-bends to the 21-11/16" x 3/64" [550 x 1mm] carbon rudder pushrod, using one of the provided 1" [25.4mm] lengths of heat shrink. Use a soldering iron or heat gun to shrink the pushrod to the z-bend.

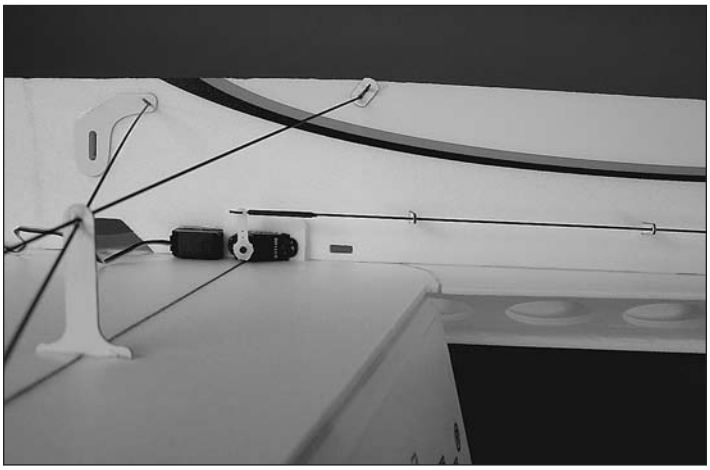


❏ 7. Use some foam safe CA to glue the foam servo doubler around the rudder servo slot. **NOTE:** The rudder servo doubler should be glued on the opposite side of the fuselage from the elevator servo.



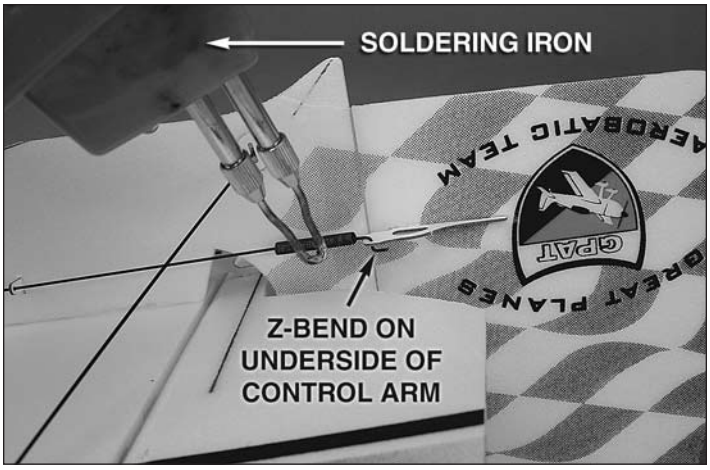
❏ 8. Starting from the nose of the airframe, thread the rudder pushrod you have partially assembled through the 5 pushrod supports. The z-bend you have applied should end up at the servo mount.





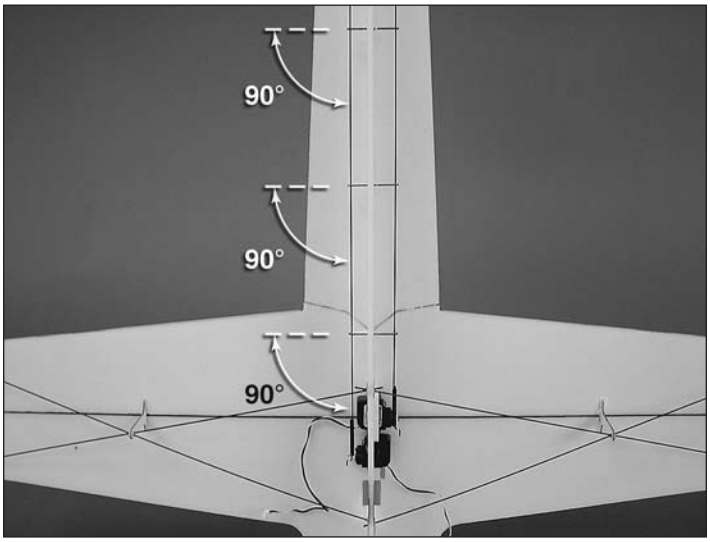
❏ 9. Install the rudder servo using the same method that was used to install the elevator servo. **NOTE:** The rudder servo will be installed on the opposite side of the fuselage from the elevator servo.

❏ 10. Once the rudder servo has been installed and has been secured using some foam safe CA, locate a control horn and glue it into the slit in the rudder, on the same side as the rudder pushrod.

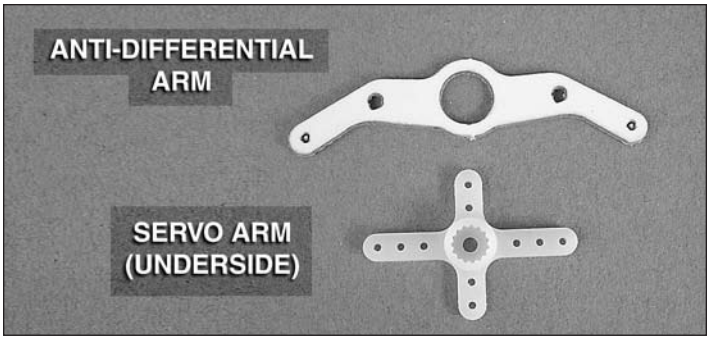


❏ 11. Thread a z-bend through the control horn, so that the pushrod mounts to the underside of the control horn. Place one of the included pieces of heat shrink around the z-bend and pushrod. Secure them together by shrinking the tubing using a soldering iron. **BE VERY CAREFUL** when using the soldering iron when very close to the foam. The foam will melt if it is touched with a hot iron.

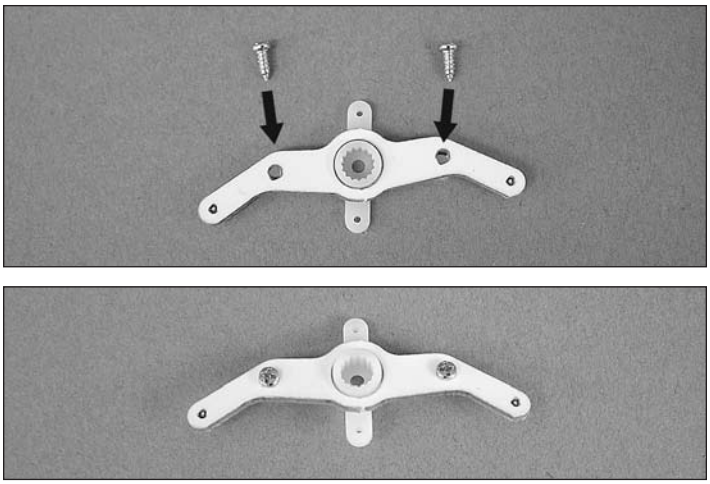
❏ 12. Re-center the rudder servo and adjust the length of the pushrod by moving the z-bends. Once the servo is centered and the rudder is in the neutral position, further secure the z-bends to the rudder pushrod using some CA glue.



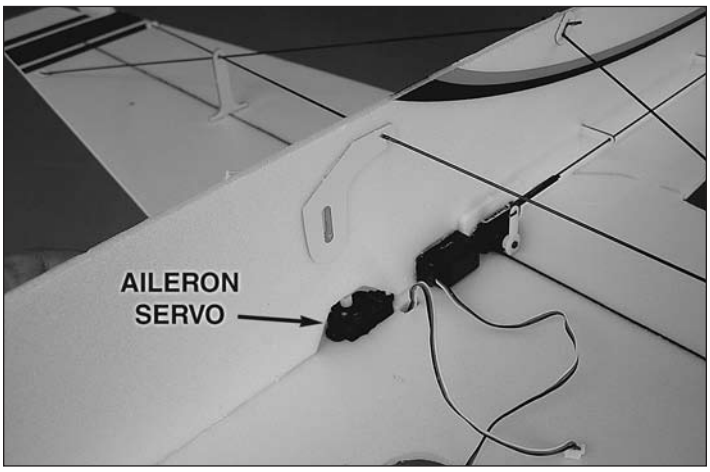
❏ 13. Align the pushrod guides so that they are perpendicular to the fuselage and keep the pushrods as straight as possible. Then glue the pushrod guides to the fuselage using some foam safe CA.



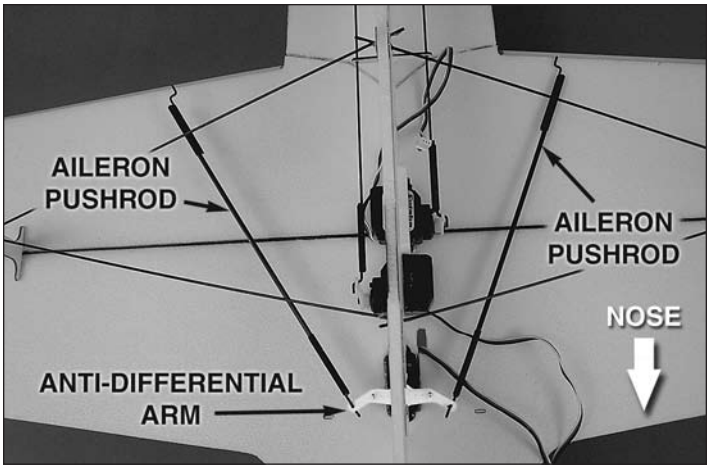
❏ 14. Locate the anti-differential arm and your aileron servo arm. Place the anti-differential arm on the underside of the servo arm. If you are using Futaba servo arms, the holes in the servo arm and the holes in the anti-differential arm will align. If you are using another brand servo arm, you will need to use a #60 [1mm] drill bit to drill a pilot hole through the servo arm that will align the servo arm with the anti-differential arm.



❏ 15. Attach the anti-differential arm to the servo arm by inserting the provided 3/64" [1.2mm] servo screws through the anti-differential arm and into the servo arm.



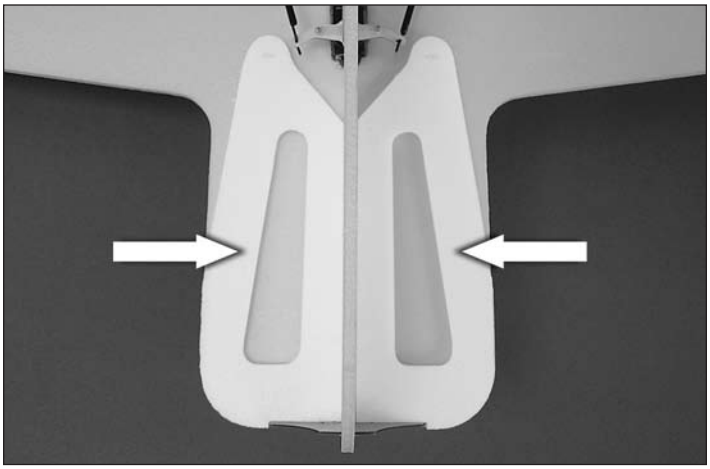
❏ 16. Secure the aileron servo to the location shown using some foam-safe CA glue.

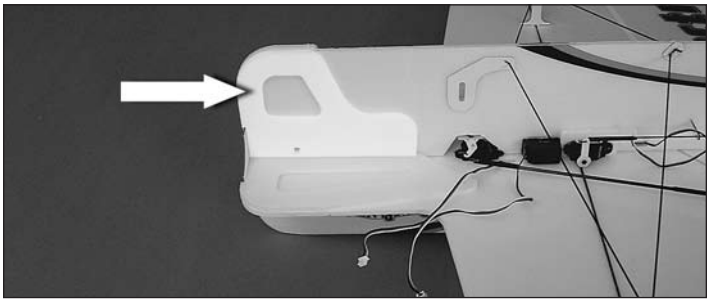


❏ 17. Attach one end of each pre-assembled 2mm aileron pushrod to either end of the anti-differential arm, and place the servo arm onto the servo. Look closely at the picture to determine the correct direction of the anti-differential arm.

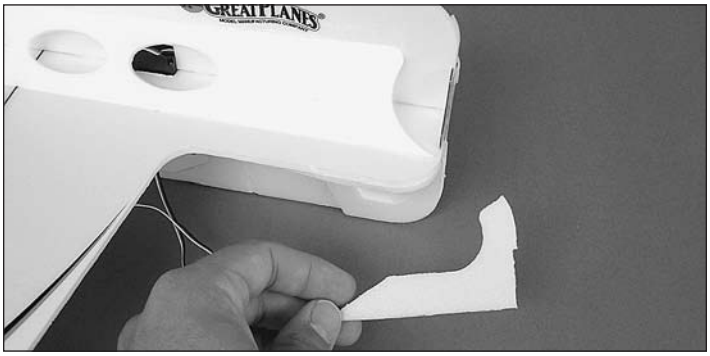
❏ 18. Thread a control horn onto each end of the aileron pushrods and glue them into the slits in the ailerons using some CA glue.

INSTALLING THE MOTOR AND RADIO GEAR

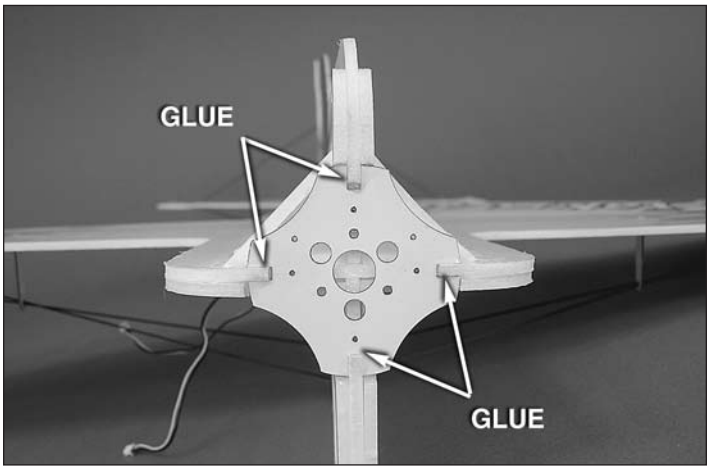




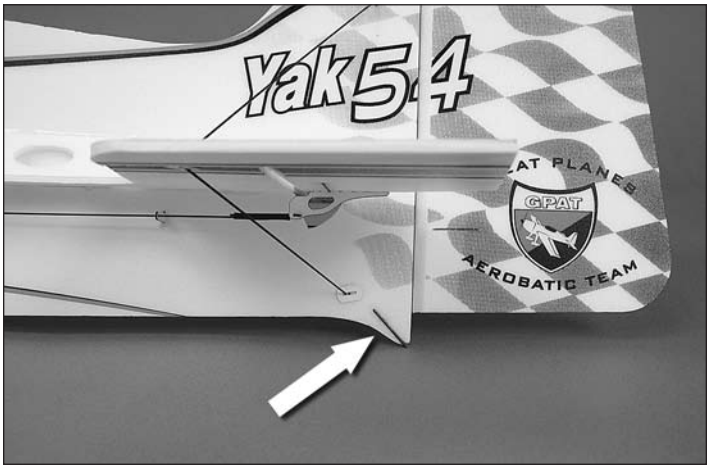
❏ 1. Glue the horizontal and vertical fuselage doublers to the underside of the horizontal and vertical fuselage as shown.



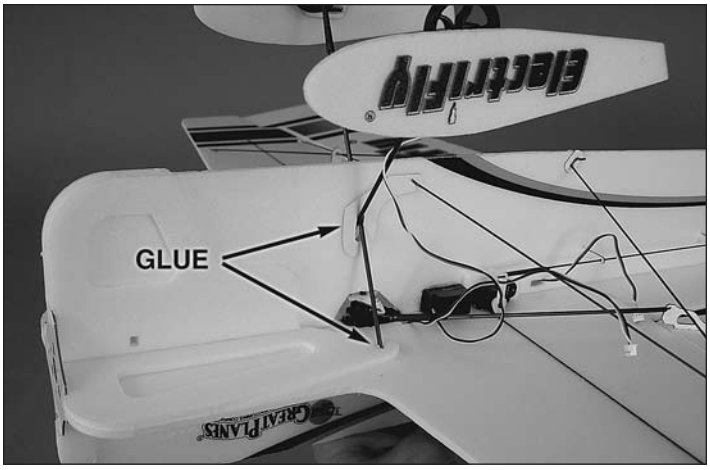
❏ 2. Glue the upper horizontal fuselage doubler to either side of the upper horizontal fuselage as shown.



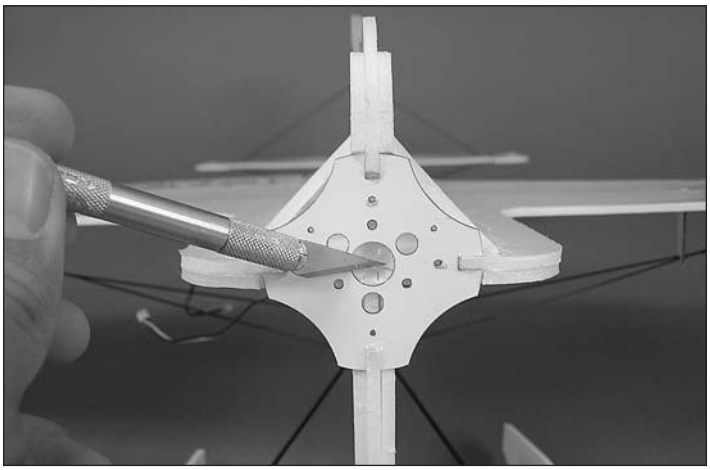
❏ 3. This is a good time to reinforce the motor mount by adding some glue around the edges, and to the front of the ABS motor mount.



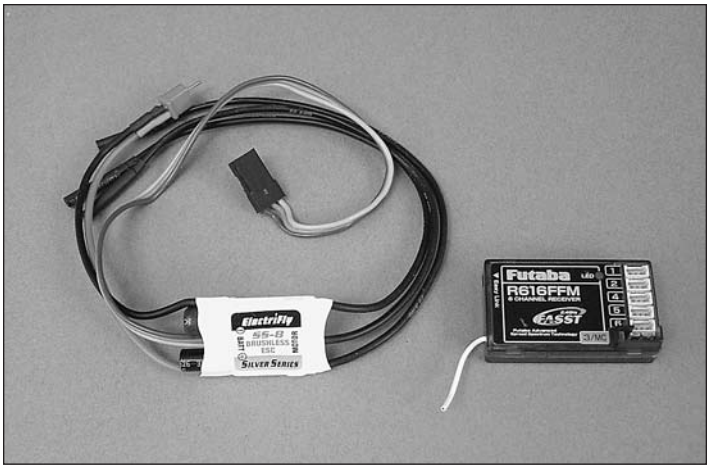
❏ 4. Locate the 1/8" x 3/64" x 1" [3 x 1 x 24.5mm] flat, carbon tail skid and glue it into the slit on the underside of the tail, as shown.

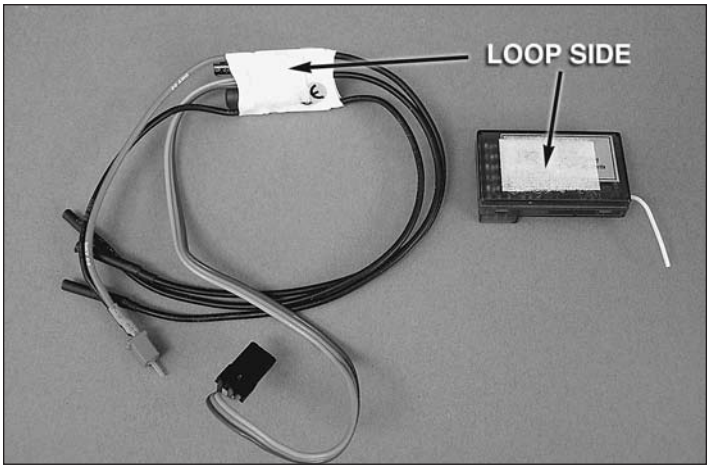


❏ 5. Locate the landing gear. Remove the tape holding them in place and thread them through the vertical fuselage and into the horizontal fuselage. Be careful, **DO NOT** press the landing gear all the way through the horizontal fuselage. Glue the landing gear in place using some foam-safe CA glue.

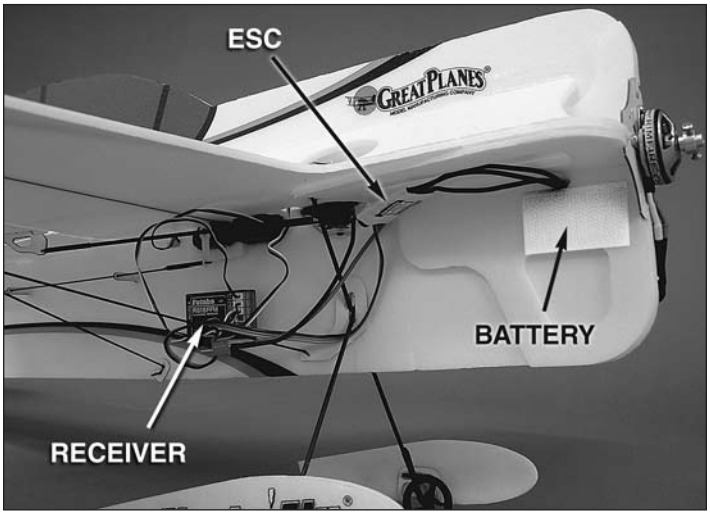


❏ 6. Use a hobby knife to remove the foam that sits behind the center hole of the motor mount, so that it does not interfere with the operation of the motor. Install the motor to the motor mount using the screws provided with the motor, or using the 3/8" x 5/64" [10 x 2mm] self tapping screws provided with the Yak.





❏ 7. Place a small amount of the loop side of the self adhesive hook and loop material to the back of the ESC and receiver that will be used.



❏ 8. Place the hook portion of the self adhesive hook and loop material on the Yak at the positions you wish to mount the receiver, ESC, and battery. One example of where to position the radio gear is shown above. These components may be placed anywhere on the fuselage, as long as they do not interfere with the action of the servos.

❏ 9. Install the propeller and propeller adaptor onto the motor.

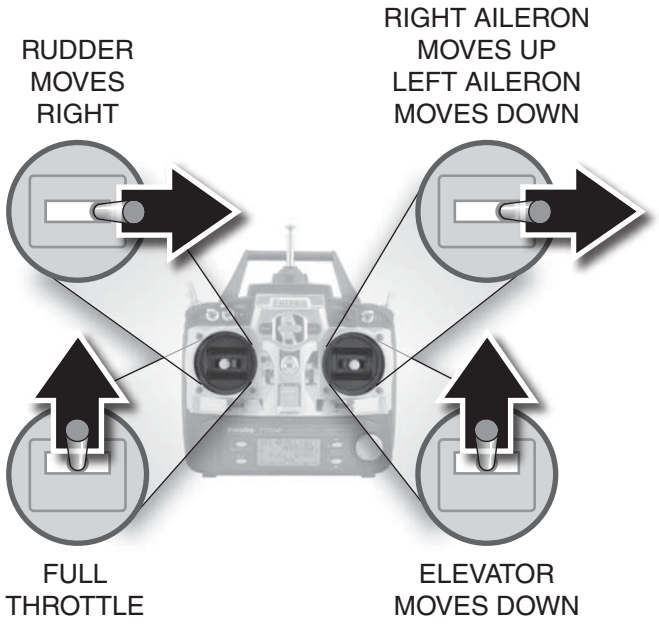
GET THE MODEL READY TO FLY

Check the Control Directions

❏ 1. Turn on the transmitter and receiver and center the servos. Make certain all the servo arm screws are in place.

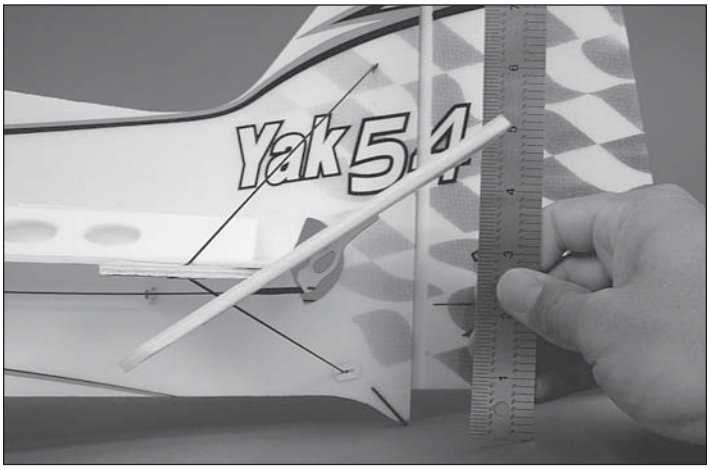
❏ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the pushrod lengths to center the control surfaces.

4-CHANNEL RADIO SETUP (STANDARD MODE 2)



❏ 3. Make certain that the control surfaces and the electric motor 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 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 RATE		**3D RATE**	
ELEVATOR	Up	Down	Up	Down
	1-3/4" [44mm] 30deg	1-3/4" [44mm] 30deg	2-3/4" [70mm] 52deg	2-3/4" [70mm] 52deg
RUDDER	Right	Left	Right	Left
	1-3/4" [44mm] 20deg	1-3/4" [44mm] 20deg	4" [102mm] 53deg	4" [102mm] 53deg
AILERONS	Up	Down	Up	Down
	2" [51mm] 27deg	2" [51mm] 27deg	3-1/2" [89mm] 53deg	3-1/2" [89mm] 53deg

Note: It is highly recommended that a computer radio with exponential be used, if this airplane is to be flown using the 3D control surface throws. Use the exponential function to lessen the control movement around center without changing the control surface endpoints. –50% is a good exponential starting value to use for these 3D rates. Feel free to adjust the 3D throw exponential value to suit your flying style.

IMPORTANT: The Yak 54 3D Indoor EP ARF 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 Yak 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."

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 brushless motor, landing gear, the radio system, and battery pack.

❏ 1. A "**+**" mark has been included on the fuselage, at the rear of the servo mounts, as a reference for balancing the model. **The recommended C.G. is located 3/4" [19 mm] in front of this mark.**

This is where your model should balance for the first flights. Later, you may wish to experiment by shifting the C.G. up to **1-1/4" [32 mm] forward of the mark or back, to the mark**, 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 all parts of the model installed (ready to fly) lift the model upside-down at the balance point you desire.

❏ 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.

❏ 4. **IMPORTANT:** If you found it necessary to add any weight or move components, recheck the C.G. after the changes have been made

PREFLIGHT

Identify Your Model

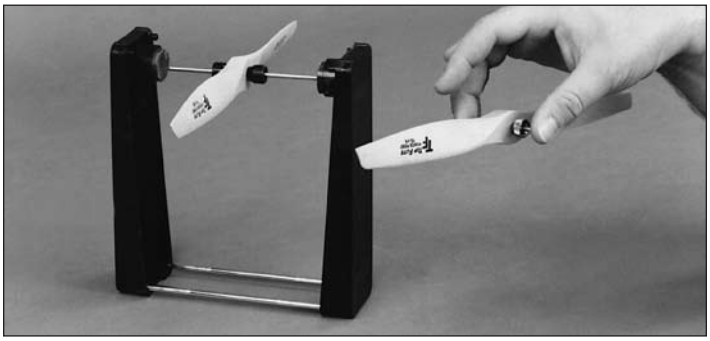
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 23 (or on the decal sheet) 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 motor mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery.

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.

Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed, or with the power down mode activated, and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. 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 motor 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.

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 motors.

Use safety glasses when starting or 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 start and run the motor.

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.

LITHIUM BATTERY HANDLING AND USAGE

WARNING!! Read the entire instruction sheet included with your battery. Failure to follow all instructions could cause permanent damage to the battery and its surroundings, and cause bodily harm!

- ONLY use a LiPo approved charger. NEVER use a NiCd/NiMH peak charger!
- NEVER charge in excess of 4.20V per cell.
- ONLY charge through the "charge" lead. NEVER charge through the "discharge" lead.
- NEVER charge at currents greater than 1C.
- ALWAYS set charger's output volts to match battery volts.
- ALWAYS charge in a fireproof location.
- NEVER trickle charge.
- NEVER allow the battery temperature to exceed 150° F (65° C).
- NEVER disassemble or modify pack wiring in any way or puncture cells.
- NEVER discharge below 2.5V per cell.
- NEVER place on combustible materials or leave unattended during charge or discharge.
- ALWAYS KEEP OUT OF REACH OF CHILDREN.

AMA SAFETY CODE (EXCERPTS)

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.

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

❏ 5. Make sure all hinges are **securely** in place.

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

❏ 7. Make sure that all servo arms are secured to the servos with the screws included with your radio.

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

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

❏ 10. Place your name, address, AMA number and telephone number on your model.

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

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

FLYING

The Yak 54 3D Indoor EP ARF is an airplane suitable for both indoor and outdoor flying. If you plan on flying outdoors, make sure that you choose days with very light to calm winds (gusting to less than 5 mph). If this is your first experience with an indoor-style foamie, seek help from experienced modelers. Join a local flying club or ask your local hobby dealer where the nearest approved flying sites are in your area.

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). 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; Not mounting control horns solidly; Excessive free play in servo gears; Insecure servo mounting; and one of the most prevalent causes of flutter; Flying the model at excessive speeds.

Takeoff

The Yak 54 3D Indoor EP ARF can take off from the ground (ROG) or can be hand launched. Rise-off-ground (ROG) takeoffs should be reserved for indoor flying and should be performed with the model rolling away from you and others. For your first flight it's probably a good idea to have an assistant hand-launch the plane for you. You should be ready to correct (or fly through) any trim errors. First, set your transmitter for **LOW RATES**. Launch your plane directly into the wind (and away from others). After your assistant launches the plane, have him come back and adjust the trim on your transmitter. If you want to perform an ROG takeoff, make sure the surface you're using is completely smooth and free from "potholes" that can flip the plane or break the landing gear.

Flight

When you're airborne and your plane is trimmed out, throttle back and fly the pattern. Get used to the way the model handles with standard control inputs. Based on your preference, you may want to adjust your rates or exponential settings in your radio. If your assistant is still available, have him take notes for you so you can make adjustments when you land. Fly around for a bit and try a few simple maneuvers like: slow flight, gentle rolls, loops, stalls, and hammerhead stalls. Practice a few landing approaches.

Landing

Before you land, throttle down completely (with a safe amount of altitude). You'll notice that when you power off, the airplane will lose speed very quickly but will not pitch down. To keep your speed up you'll have to pitch down rather steeply and this can be less than ideal for most landings. Set up for landing by throttling down to an "idle" instead. If you find it difficult to get the right setting, power-off completely and try blipping the throttle. For a short approach, power-off completely while at altitude and pitch down. At the flare, be ready to blip the throttle for a gentle 3-point landing.

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. 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