REACTOR™

EPERFORMANCE SERIES

INSTRUCTION MANUAL

Wingspan: 41.5 in [1050mm]
Wing Area: 384 sq in [24.8dm²]
Weight: 24 – 27 oz [680 – 765g]
Wing Loading: 9.0 – 10.1 oz/sq ft [27 – 31g/dm²]
Length: 42 in [1065mm]
Radio: 4-channel with 4 micro [7g] servos and micro receiver
Motor: Brushless in-runner with gear-drive or brushless out-runner

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

The Reactor™ 3D EP ARF is the first of a line of electric, built-up, all-out performance 3D planes from Great Planes. Using the recommended brushless power systems, the Reactor 3D EP ARF can perform virtually any aerobatic maneuver with authority. High capacity LiPo battery packs will allow you the convenience of electric flying, combined with the flight characteristics of planes much larger in size. The sleek lines and vibrant colors of the Reactor 3D EP ARF will surely gain attention at the flying field!

For the latest technical updates or manual corrections to the Reactor 3D EP ARF visit the Great Planes web site at **www.greatplanes.com**. Open the "Airplanes" link, then select the Reactor 3D 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
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 Reactor 3D 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 Reactor 3D 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 correctly install all R/C and other components so that the model operates correctly on the ground and in the air.

5. 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.

6. 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.

7. 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 Reactor 3D EP ARF that may require planning or decision-making before starting to build. Order numbers are provided in parentheses.

Radio Equipment

A 4-channel radio system with four micro servos and a micro receiver are required for this plane. The servos and receiver shown in the manual are Futaba® S3110 micro servos and the Futaba R114F micro receiver. Two 6" [152mm] servo extensions, two 20" [500mm] servo extensions, and a Y-harness are also required. Order numbers for these items are provided below.

- (4) Futaba S3110 Micro High Torque Servo [7.7g] (FUTM0046)
- Futaba R114F FM Micro Receiver (Low Band – FUTL0442, High Band – FUTL0443)
- Futaba FM Single Conversion Short Crystal (Low Band – FUTL62**, High Band – FUTL63**)
- (2) Futaba C-25 Extension Slim Wire 6" [152mm] (FUTM4506)
- (2) Futaba 20" [500mm] Heavy-Duty Servo Extension J (FUTM4147)

Motor Recommendations

The Reactor 3D EP ARF comes with mounting boxes to use either a Great Planes Ammo™ brushless in-runner motor with gear-drive or a Great Planes RimFire™ brushless out-runner motor. The motors that have been tested and perform well in this plane are listed below. (If using the in-runner motor with gear-drive, be sure to install the 11T pinion gear that is included with the gear-drive to achieve a gear ratio of 4.5:1.)

- Great Planes Ammo 24-33-4040kV Brushless In-runner Motor (GPMG5165)
- Great Planes Gear-Drive 24mm In-runner Motors (GPMG0505)
- Great Planes RimFire 35-30-950kV Brushless Out-runner Motor (GPMG4590)

Note: Motors from other manufacturers may work with the Reactor 3D EP ARF. However, the included firewall pieces are designed to work specifically with the Great Planes motors listed.

Propeller

- If using the recommended Ammo Brushless In-runner motor with 4.5:1 gear-drive, or the recommended RimFire Brushless Out-runner motor, you will need a 10x4.5 Slo-Flyer Electric Propeller (GPMQ6660).

Electronic Speed Control

A brushless ESC (electronic speed control) is required for this plane. We recommend using the Great Planes Silver Series 25A Brushless ESC 5V/2A BEC (GPMM1820).

Battery Pack

The Reactor 3D EP ARF has been flown with 11.1V LiPo packs ranging from 1250mAh to 2100mAh. Order numbers are provided for packs of this size. The lighter 1250mAh pack is suggested for maximum performance.

- Great Planes LiPo 1250mAh 11.1V 20C Discharge w/Balance (GPMP0609)

- Great Planes LiPo 1500mAh 11.1V 20C Discharge w/Balance (GPMP0613)

- Great Planes LiPo 2100mAh 11.1V 20C Discharge w/Balance (GPMP0617)

Note: Do not use Great Planes LiPo 1500mAh 11.1V 3S 8C Discharge (GPMP0831). This battery pack is not capable of supporting the current draw of the recommended power systems.

Required Adhesive & Building Supplies

This is the list of adhesive and building supplies required to finish the Reactor 3D EP ARF. Order numbers are provided in parentheses.

- ❏ 1/2 oz. [15g] Thin Pro™ CA (GPMR6001)
- ❏ 1/2 oz. [15g] Medium Pro CA+ (GPMR6007)
- ❏ Pro 30-minute epoxy (GPMR6047)
- ❏ Denatured alcohol
- ❏ Drill bits: 5/64" [2mm], #54 (.0550")
- ❏ #1 Hobby knife (HCAR0105)
- ❏ #11 Blades (5-pack, HCAR0211)
- ❏ Hobbico® steel T-pins 1" [25mm] (100, HCAR5100)

Optional Supplies & Tools

Here is a list of optional supplies and tools mentioned in the manual that will help you build the Reactor 3D EP ARF.

- ❏ 1" [25mm] Double-sided foam mounting tape (GPMQ4442)
- ❏ 21st Century® sealing iron (COVR2700)
- ❏ 21st Century iron cover (COVR2702)
- ❏ 2 oz. [57g] Spray CA activator (GPMR6035)
- ❏ 4 oz. [113g] Aerosol CA activator (GPMR634)
- ❏ CA applicator tips (HCAR3780)
- ❏ CA debonder (GPMR6039)
- ❏ Epoxy brushes (6, GPMR8060)
- ❏ Mixing sticks (50, GPMR8055)
- ❏ Mixing cups (GPMR8056)
- ❏ Hobbico Duster™ can of compressed air (HCAR5500)
- ❏ K & S #801 Kevlar® thread (for stab alignment, K+SR4575)
- ❏ Panel line pen (TOPQ2510)
- ❏ Rotary tool such as Dremel®
- ❏ AccuThrow™ deflection gauge (GPMR2405)
- ❏ Hobbico flexible 18" ruler stainless steel (HCAR0460)

IMPORTANT BUILDING NOTES

- When you see the term ***test fit*** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or *custom fit* the part as necessary for the best fit.

- Whenever the term ***glue*** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will make a recommendation.

- Whenever just ***epoxy*** is specified you may use **either** 30-minute (or 45-minute) epoxy **or** 6-minute epoxy. When 30-minute epoxy is specified it is **highly** recommended that you use only 30-minute (or 45-minute) epoxy, because you will need the working time and/or the additional strength.

- ***Photos*** and ***sketches*** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.

- The stabilizer and wing incidences and engine thrust angles have been factory-built into this model. However, some technically-minded modelers may wish to check these measurements anyway. To view this information visit the web site at **www.greatplanes.com** and click on "Technical Data." Due to manufacturing tolerances which will have little or no effect on the way your model will fly, please expect slight deviations between your model and the published values.

ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes Reactor 3D 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.

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

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

Mail parts orders and payments by personal check to:

Hobby Services
3002 N. Apollo Drive, Suite 1
Champaign, IL 61822

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

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

Description	**How to Purchase**
Missing pieces	Contact Product Support
Instruction manual	Contact Product Support
Full-size plans	Not available
Kit parts listed below	Hobby Supplier

Replacement Parts List

GPMA2935 .....Wing Kit
GPMA2936 .....Fuse Kit
GPMA2937 .....Tail Set
GPMA2938 .....Cowl
GPMA2939 .....Canopy
GPMA2940 .....Landing Gear
GPMA2941 .....Wheel Pants
GPMA2942 .....Hardware Set
GPMA2943 .....Decal Sheet

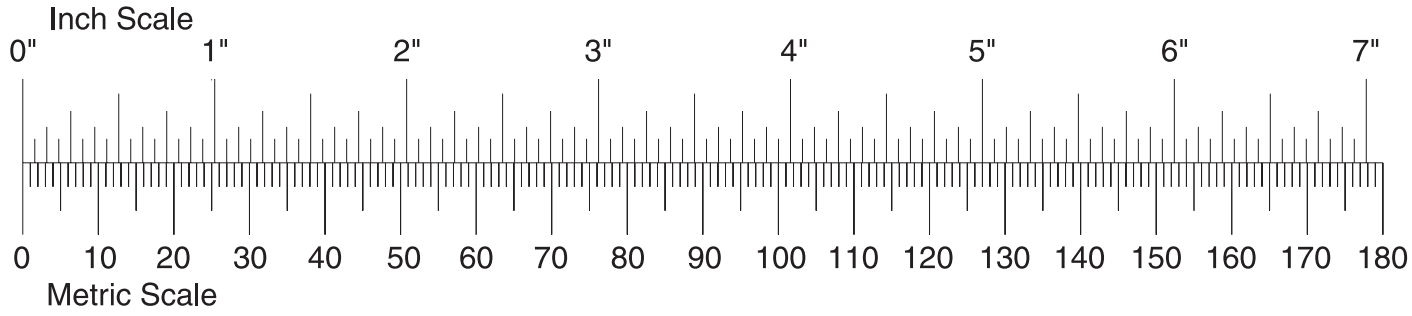
COMMON ABBREVIATIONS

Fuse = Fuselage
Stab = Horizontal Stabilizer
Fin = Vertical Fin
LE = Leading Edge
TE = Trailing Edge
LG = Landing Gear
Ply = Plywood
" = Inches
mm = Millimeters
ESC = Electronic Speed Control
SHCS = Socket Head Cap Screw

METRIC CONVERSIONS

1" = 25.4mm (conversion factor)

1/64"	=	.4mm	3/4"	=	19.0mm
1/32"	=	.8mm	1"	=	25.4mm
1/16"	=	1.6mm	2"	=	50.8mm
3/32"	=	2.4mm	3"	=	76.2mm
1/8"	=	3.2mm	6"	=	152.4mm
5/32"	=	4.0mm	12"	=	304.8mm
3/16"	=	4.8mm	18"	=	457.2mm
1/4"	=	6.4mm	21"	=	533.4mm
3/8"	=	9.5mm	24"	=	609.6mm
1/2"	=	12.7mm	30"	=	762.0mm
5/8"	=	15.9mm	36"	=	914.4mm

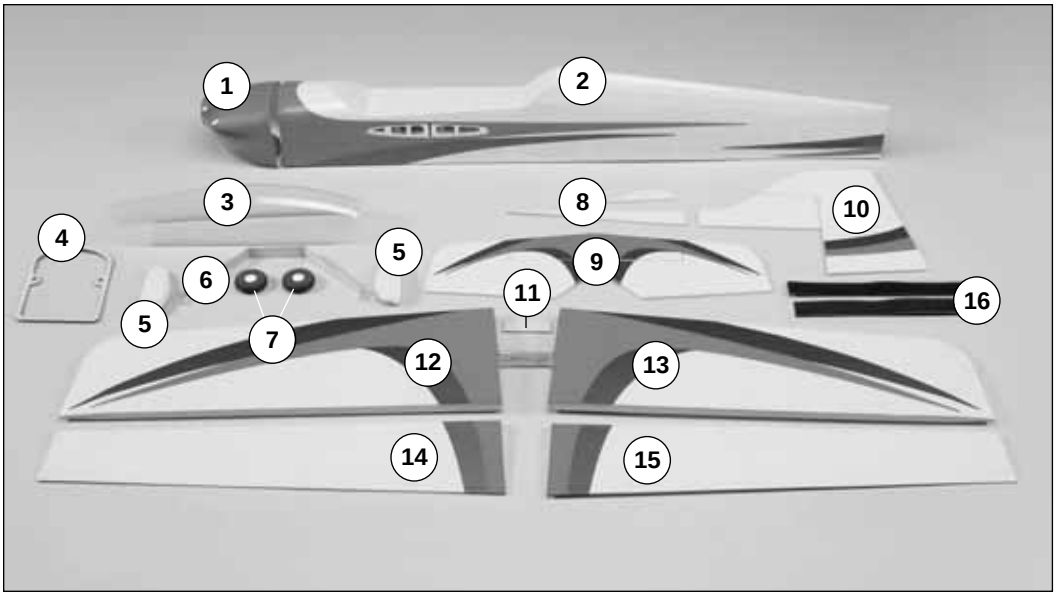


KIT INSPECTION

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. Cowl
2. Fuselage
3. Canopy
4. Cowl Ring
5. Wheel Pants (L&R)
6. Landing Gear
7. Wheels (2)
8. Tail Skid Parts
9. Horizontal Stabilizer & Elevator Halves
10. Vertical Fin & Rudder
11. Balsa Spar Doubler
12. Left Wing Panel w/Center Spar
13. Right Wing Panel w/Center Spar
14. Left Aileron
15. Right Aileron
16. Hook & Loop Material

Kit Contents (Not Photographed)

(1) Battery Hatch
(1) Elevator Joiner Wire
(1) 1-1/2" [38mm] Spinner
(1) In-runner Motor Mounting Box
(1) Out-runner Motor Mounting Box
(2) Wing Alignment Jigs
(1) Adhesive-backed Hook and Loop Material
(8) Adjustable Clevises
(4) Control Horns
(2) Control Horn Backplates
(12) Double-sided Servo Arms

(2) 2 x 85mm Carbon Pushrods
(2) 2 x 150mm Carbon Pushrods
(2) 2 x 20mm Machine Screws
(4) 2mm Flat Washers
(2) 2mm Nuts
(2) 3 x 6mm SHCS
(4) 3mm Flat Washers
(6) Magnets

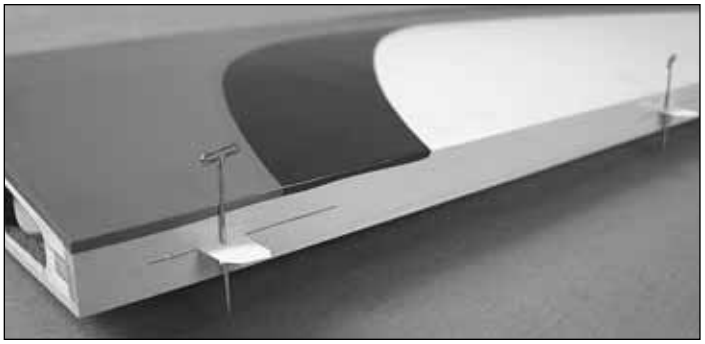
PREPARATIONS

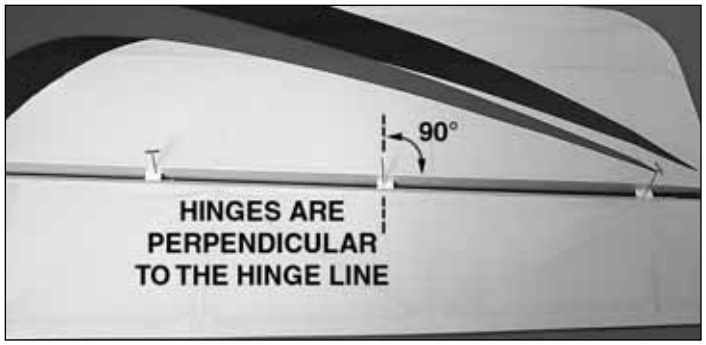
❏ 1. If you have not done so already, remove the major parts of the kit from the box and inspect them for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the ***"Kit Inspection"*** section on page 6. **Important! Save the bag that the fuselage is packaged in for a building step later in this manual.**

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

ASSEMBLE THE WING PANELS

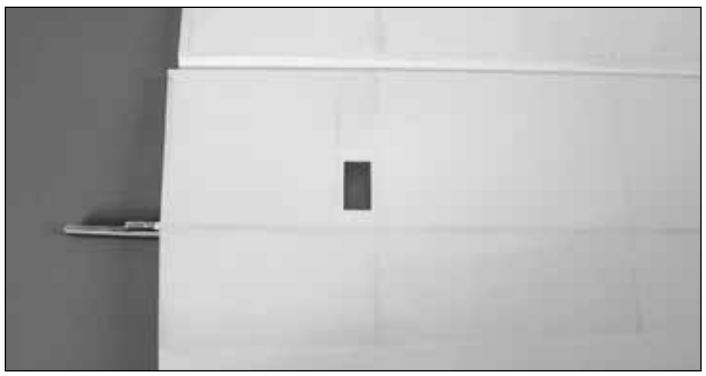
❏ 1. Test fit the pre-cut CA hinges into the slots in the **ailerons** and **wing panels**. If any are difficult to install, use a hobby knife in the slot to slightly enlarge it.





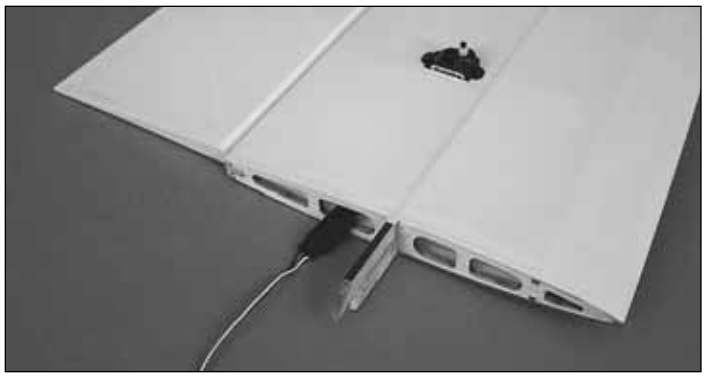
❏ 2. Insert the CA hinges halfway into the slots in the wing panels. Push small T-pins through the middle of the hinges to keep them centered. Insert the ailerons onto the other ends of the hinges. Align the outer tips of the ailerons flush with the wing tips. Pull the ailerons away from the panels far enough to confirm that the hinges remained perpendicular with the hinge line. If not, use a hobby knife or small screwdriver to nudge them straight.

❏ 3. When satisfied, push the ailerons up against the wing panels and carefully remove the T-pins. Use thin CA glue to secure the ailerons by applying 3 to 4 drops onto both sides of each hinge.



❏ 4. Trim the covering from the **aileron servo bays** on the underside of the wing panels.

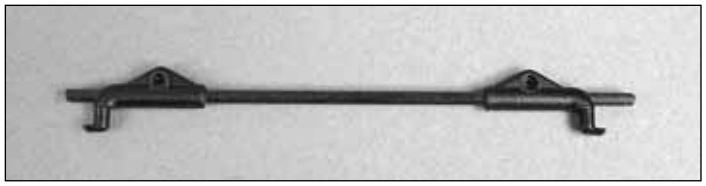
❑ 5. Insert the servo leads into the servo bays and pull them through the wing ribs. Glue the aileron servos into the servo bays using epoxy or CA glue. After the glue has cured, confirm that the servos are properly secured to the wings and reinforce with extra glue if necessary.

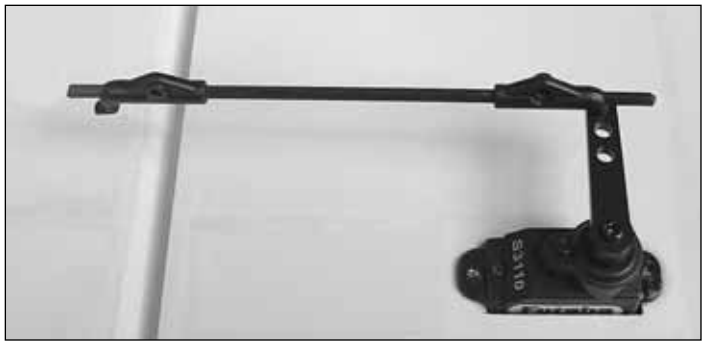


❑ 6. Attach a 6" [152mm] servo extension to each aileron servo and wrap the connection with transparent tape or heat-shrink tubing.

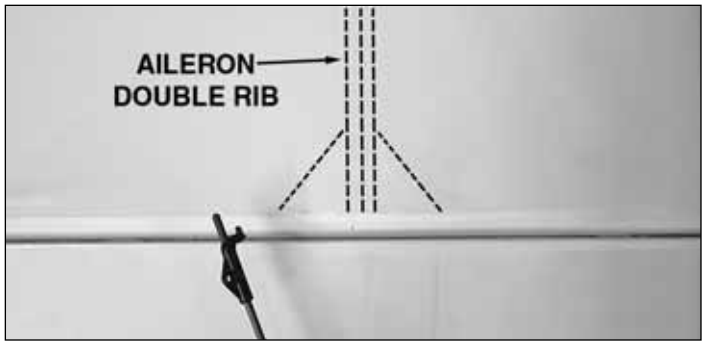
❑ 7. Locate two **double-sided servo arms** that fit the output splines of your aileron servos and four **adjustable clevises**.

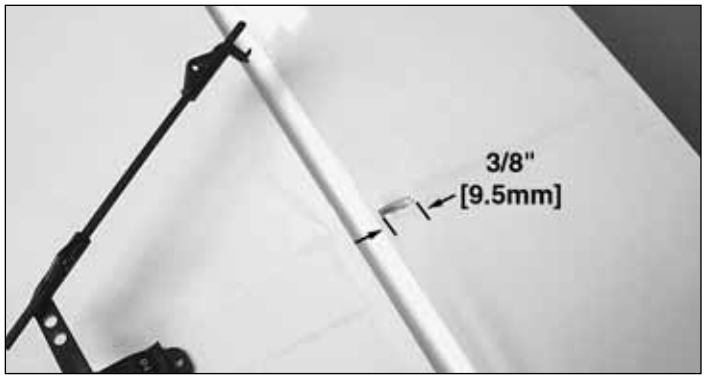
❑ 8. Temporarily connect your aileron servos and battery pack to your radio and center the servos and trim levers on the transmitter. Test fit the double-sided servo arms perpendicular to the servo case. If the servo arm does not fit onto the servo spline at a 90° angle to the case, remove it from the servo and rotate it 180°. Decide which way fits best (closest to perpendicular) and cut off the arm that isn't used. Be sure to make a left and right servo arm.

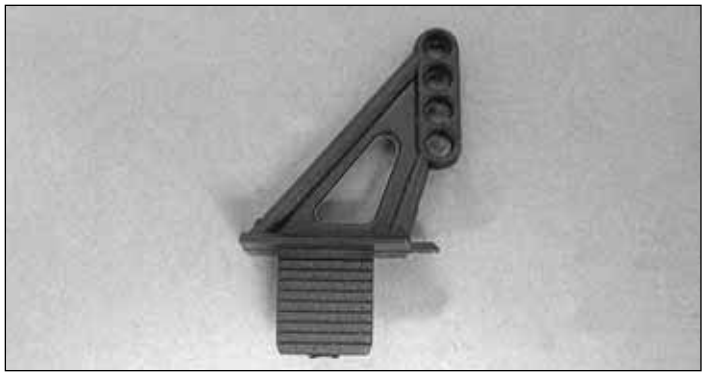




❑ 9. Fit two adjustable clevises onto both 2 x 85mm **aileron pushrods**. Push one of the clevises from each pushrod into the outer holes of the servo arms



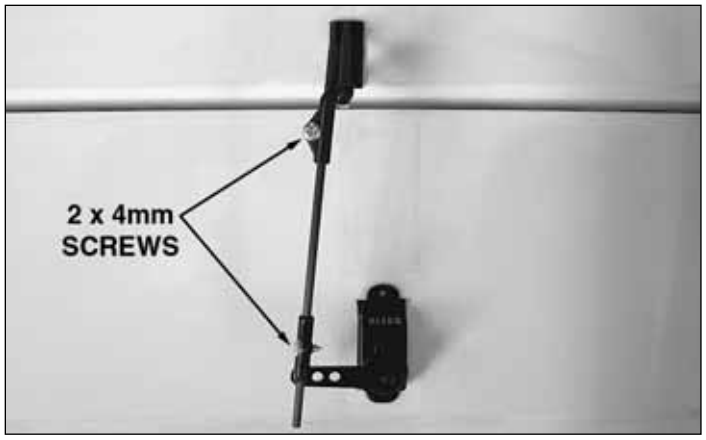




❑ 10. Locate the aileron double rib that has triangle blocking at the LE. Use a hobby knife to cut a slot 3/8" [9.5mm] long just behind the bevel of the LE of aileron for each control horn in the center of the double rib. The slot only needs to

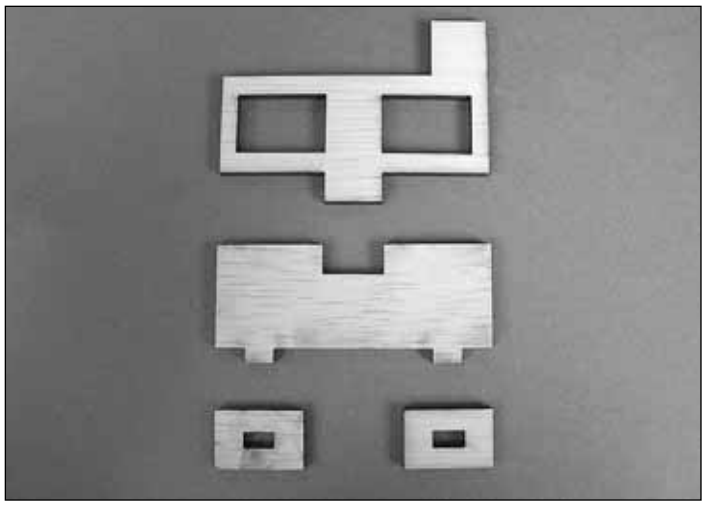
be wide enough to accommodate the thickness of the tab on the **control horn** (approximately 1/16" [1.6mm] thick). Do not cut all the way through the ailerons! A cut 3/16" to 1/4" [5 to 6.4mm] deep is sufficient.

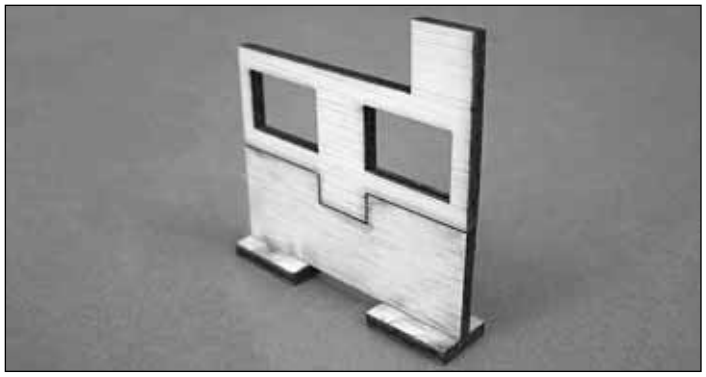
❏ 11. Trim the control horn backplate tabs so that the control horns seat flat in the slots you made. Coat the backplate tabs with medium CA and press them into the slots.



❏ 12. Use the position of the control horn to adjust the length of the pushrods as needed. Remove the servo arms from the aileron servos. Connect the other Z-bend clevises on the aileron pushrods to the control horns and reattach the servo arms. Fine-tune the length of the pushrods inside the clevises so that the ailerons are in the neutral position. Lock the clevises onto the pushrods by threading a 2 x 4mm screw into each clevis screw hole. When installed, the pushrod will be at a slight angle from perpendicular to the hinge line. The excess length of pushrod can be trimmed off if desired.

INSTALL THE WING PANELS



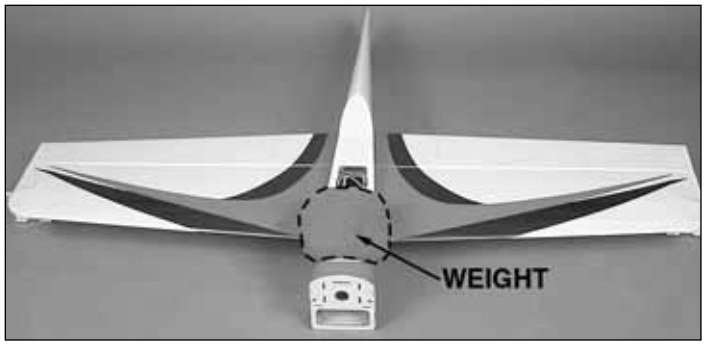


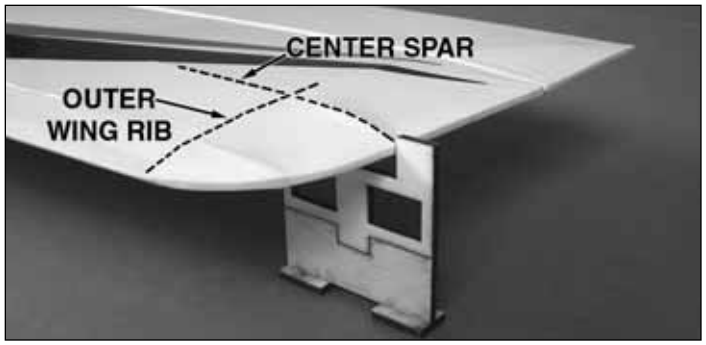
❏ 1. Locate the parts for the **wing alignment jigs**. There are enough pieces included to make two jigs. Glue the parts together as shown.

❏ 2. In order for the wing panels to be epoxied to the **fuselage** straight and level, your work surface must be flat and free of defects such as drops of dried glue that could interfere with the fuselage sitting completely flat. You will also need a weight to hold the fuselage down while the wings are being glued. We use a sock filled with sand for this purpose.

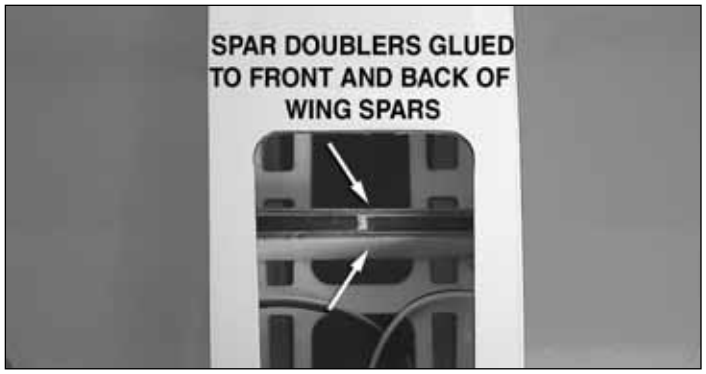
❏ 3. Before gluing, test fit both wing panels into the fuselage to confirm a proper fit. The **center spar** of each wing panel extends into the fuselage and interlocks with the spar of the other wing panel.

❏ 4. Trim the covering from the center lightening hole in the cockpit area of the fuselage as well as the covering that overlaps onto the root ribs of the wing panels.





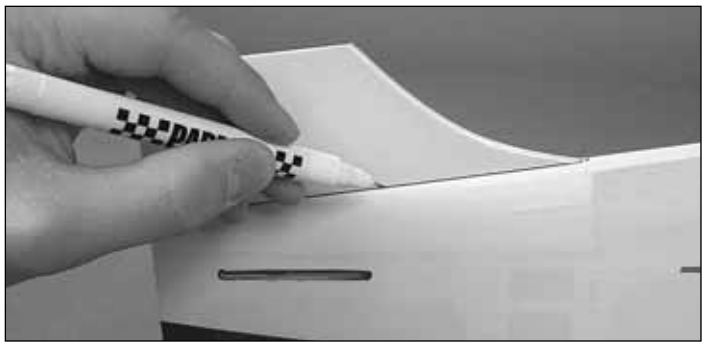
❏ 5. Place a weight onto the fuselage at a location that will not interfere with the wings or the cutout in the cockpit. Thoroughly coat the root ribs of the wing panels and the wing pockets in the fuselage with 30-minute epoxy and slide them into place. **Do not** put epoxy on the center spars at this time. Use the wing alignment jigs you constructed in step 1 to support the wing tips at the intersection of the center spar and the outer wing rib as shown. Being sure that the wing panels are fully seated into the wing pockets, use clamps to hold the center spars together while the epoxy on the root ribs cures. Clean up any excess epoxy with a paper towel dampened with denatured alcohol.



❏ 6. Coat one side of each plywood spar doubler with epoxy as well as the front and back sides of the spars. Position a doubler against each side of the spars and use clamps to hold doublers in place while the epoxy cures.

ASSEMBLE THE TAIL SECTION

❏ 1. Trim the covering from the tail of the fuselage for the **vertical fin** and the **horizontal stabilizer**.

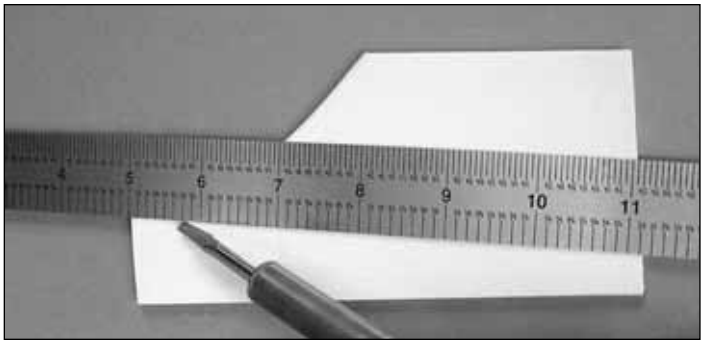


❏ 2. Fit the vertical fin into place and use a felt-tip pen to trace around the fin where it meets the fuse. Remove the fin from the fuse and trim the covering away 1/16" [1.6mm] below the line that you made. Be careful not to cut through the wood as this will weaken it. See the ***Expert Tip*** that follows for removing the covering.

EXPERT TIP

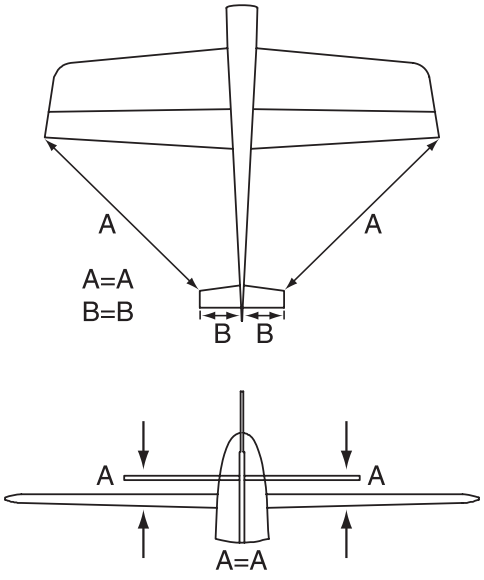
HOW TO CUT COVERING FROM BALSA

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

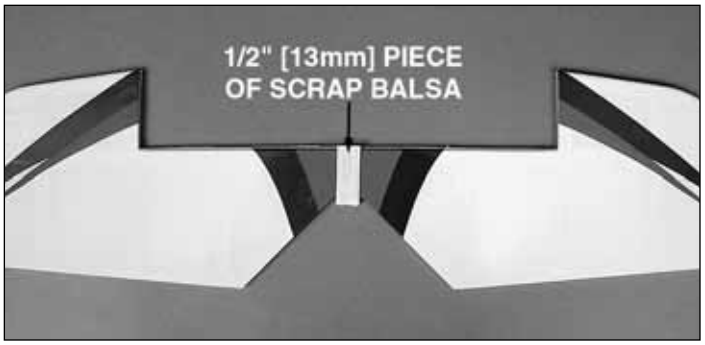


Use a straightedge to guide the soldering iron at a rate that will just melt the covering and not burn into the wood. The hotter the soldering iron, the faster it must travel to melt a fine cut. Peel off the covering.

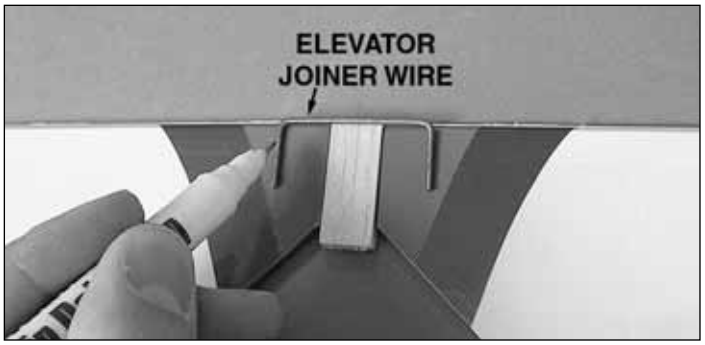
❏ 3. Wipe away the lines you drew and epoxy the fin into place.



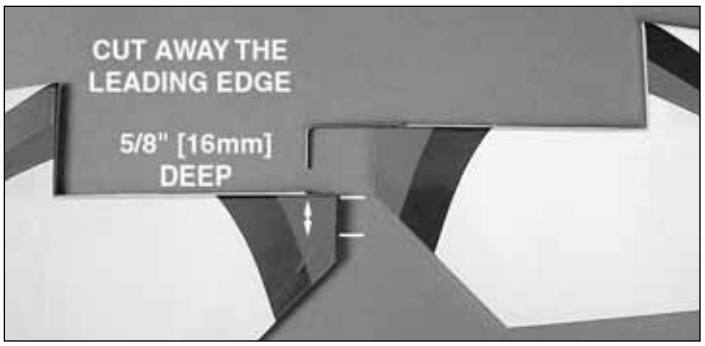
❏ 4. Position the horizontal stabilizer into the **stab saddle,** centering it left and right and making it square to the wings. Mark the outline where the stab meets the fuse as you did with the vertical fin and remove the covering inside your marks. Reposition the stab into the fuse. Stand back several feet behind the model and view it from the rear. Confirm that the stabilizer is parallel with the wing panels. If not, use tape or a weight to straighten it. Thin CA glue or epoxy can be used to glue the stabilizer in place.



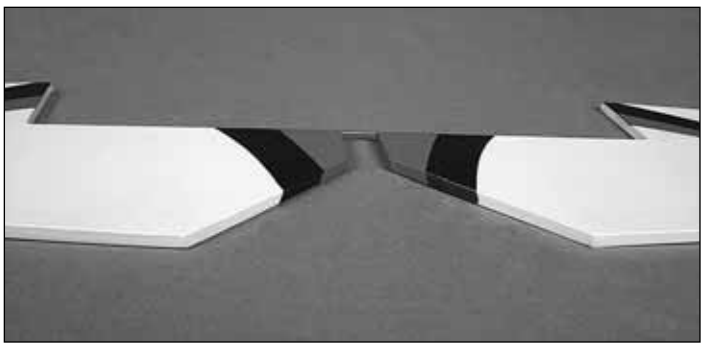
❏ 5. Position the **elevator halves** 1/2" [13mm] apart. The next step will be easier if you cut a 1/2" [13mm]-wide guide piece from scrap balsa and place it between the elevators.



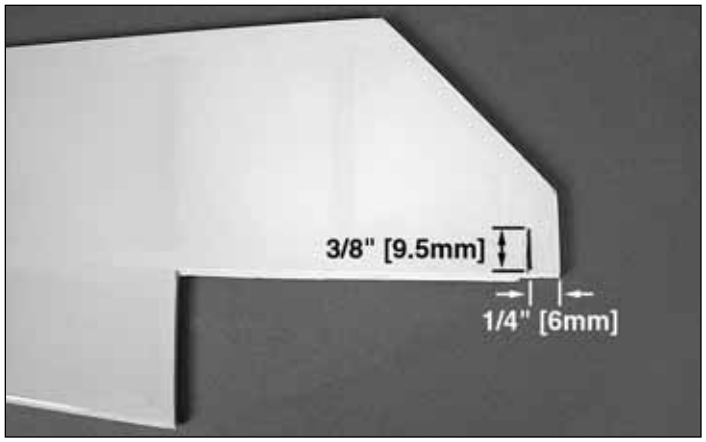
❏ 6. Center the **elevator joiner wire** over the elevators and mark its location on the LE of each elevator half.



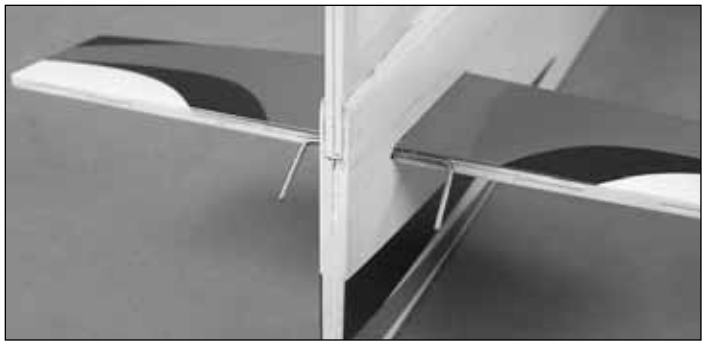
❏ 7. Using a #54 drill bit, drill 5/8" [16mm] deep holes at the marks you made through the LE of the elevators. Use a hobby knife to carve away a bit of the beveled LE inside these marks. Test fit the elevator joiner wire into the elevator halves.



❏ 8. Lay the elevators on your work surface and confirm that they both lay flat. If not, "tweak," or bend the elevator joiner wire slightly until they do.

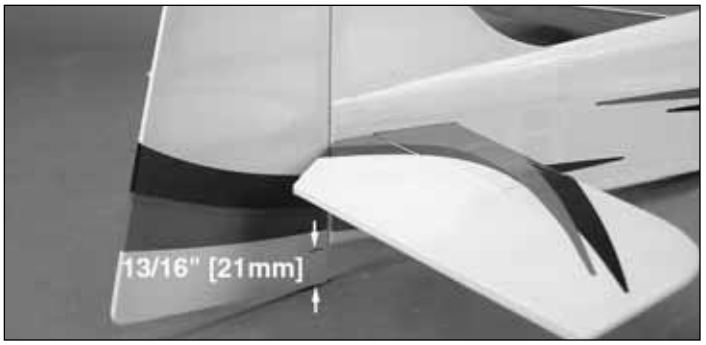


❏ 9. Cut a slot for the **elevator control horn** on the underside of the left elevator half. The slot should be 1/4" [6.4mm] from the inside edge and 3/8" [9.5mm] long. Test fit the control horn into the slot, being sure that the control horn holes are positioned over the hinge line.

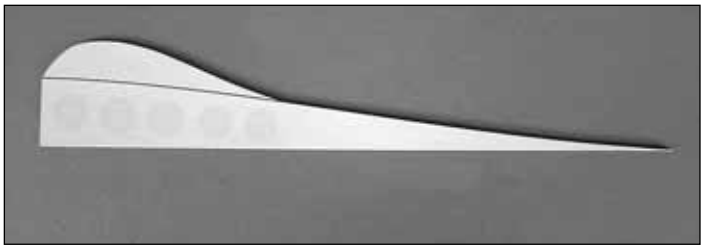


❏ 10. Insert the elevator joiner wire into the small gap behind the horizontal stabilizer.

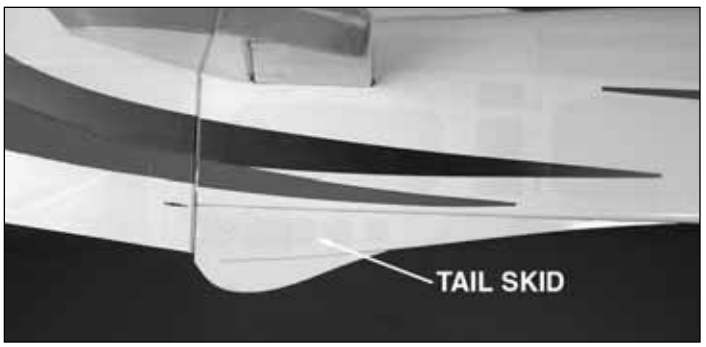
❏ 11. Before gluing, roughen the elevator joiner wire with sandpaper and clean it off with alcohol. Prepare the elevators by inserting a CA hinge into each hinge slot. Use T-pins to keep the hinges centered. Put a light coating of epoxy onto the ends of the elevator joiner wire. Install the elevators onto the elevator joiner wire while fitting the CA hinges into their mating slots in the horizontal stabilizer. As you did with the ailerons, use thin CA to glue the hinges. The hinges will hold the elevators in place while the epoxy cures.



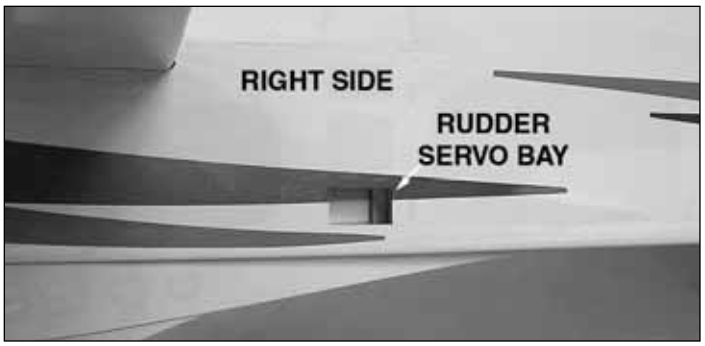
❏ 12. Cut a slot for the **rudder control horn** 13/16" [21mm] from the bottom of the **rudder**. Test fit the rudder control horn into the slot, being sure that the control horn holes are positioned over the hinge line. Attach the rudder to fuselage using three CA hinges.



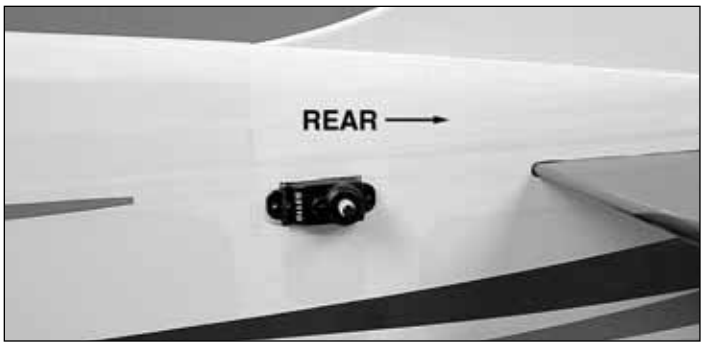
❏ 13. Using CA glue or epoxy, join the two **tail skid parts** together.



❏ 14. Glue the tail skid to the underside of the fuselage, being sure that it is centered on the fuse and positioned back against the LE of the rudder.

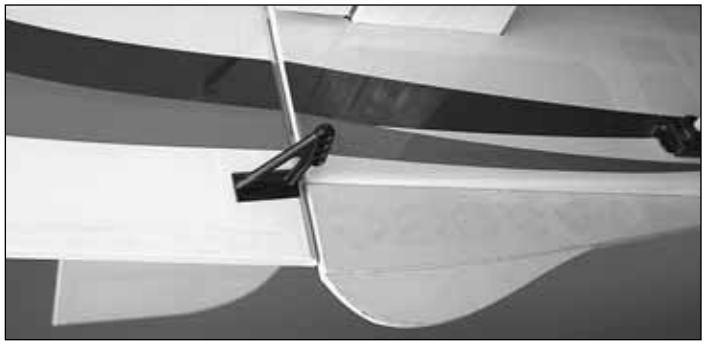


❏ 15. Trim the covering from the **elevator** and **rudder servo bays** in the fuselage. The servo bay at the top left of the fuselage is for the elevator. The bottom right servo bay is for the rudder.

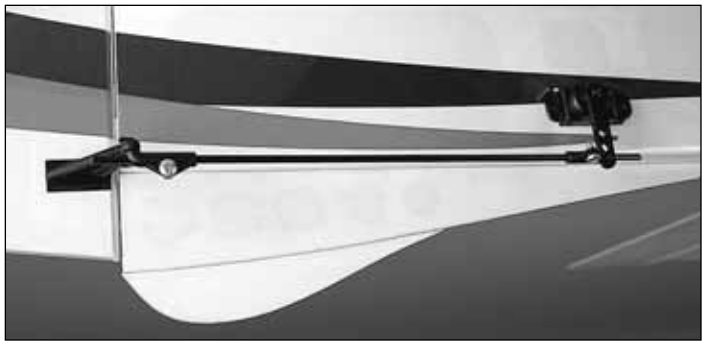


❏ 16. Attach a 20" [500mm] servo extension to the rudder and elevator servos. Feed the servo extensions through the servo bays and down through the formers of the fuselage to the cockpit area. Glue the servos into the servo bays with the servo splines toward the rear of the plane.

❏ 17. Insert a control horn into the slot on the underside of the left elevator. Press a **control horn backplate** onto the control horn tab on top of the elevator. Apply a few drops of CA glue to the control horn and backplate to secure them in place.

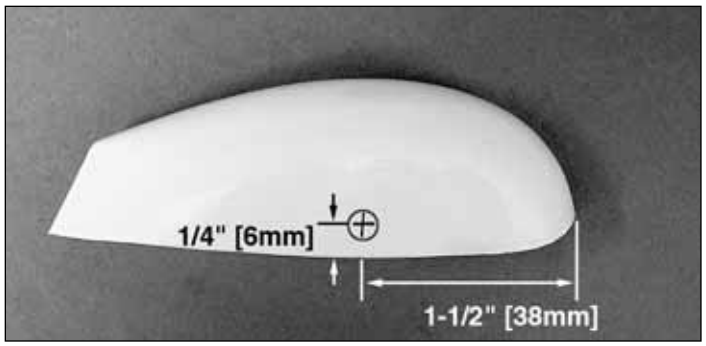


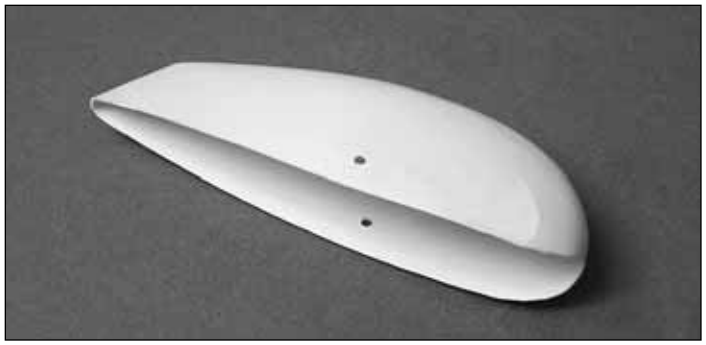
❏ 18. Attach a control horn to the right side of the rudder in the same manner.



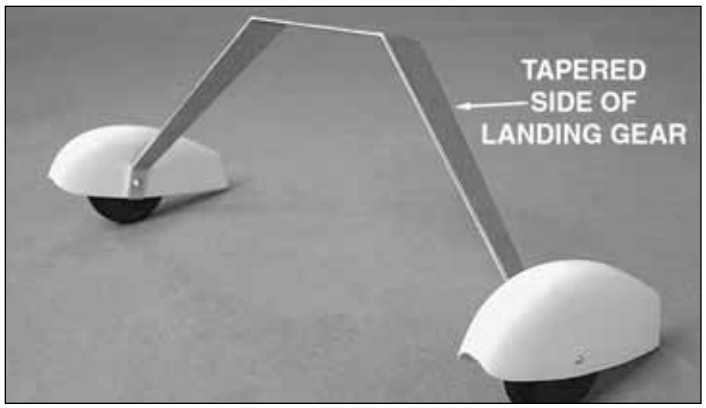
❏ 19. Locate two double-sided servo arms to fit your rudder and elevator servo splines. Cut one side from each double-sided servo arm using the same method you did with the aileron servos. With the arms both pointing down, make pushrods using the two 6" [152mm] pushrods, four adjustable clevises, and four 2 x 4mm self-tapping screws. Connect the pushrods to the outer holes of the servo arms and control horns. Adjust the elevator and rudder to the neutral position and tighten the screws into the adjustable clevises.

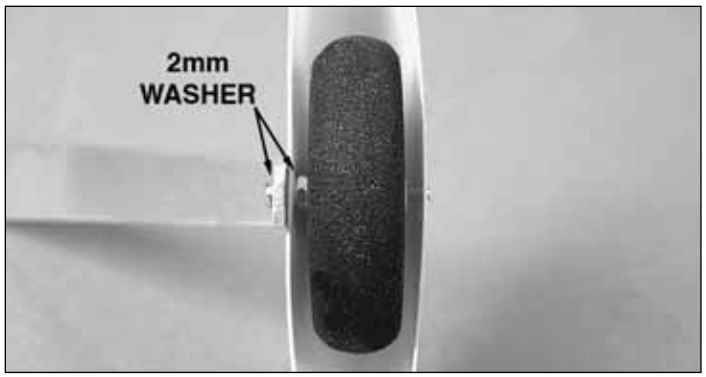
INSTALL THE LANDING GEAR



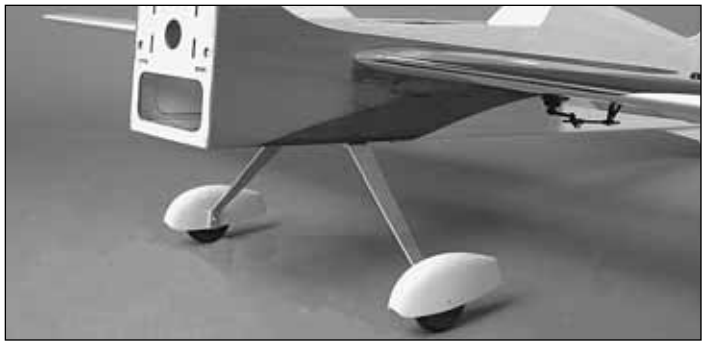


❏ 1. Measure and mark 1-1/2" [38mm] from the front and 1/4" [6.4mm] from the bottom onto both sides of the wheel pants. Drill a 5/64" [2mm] at your marks. For an accurately placed hole, use a pin or small drill bit to make a pilot hole.





❏ 2. Slide a 2mm washer onto a 2 x 20mm machine screw. Insert the screw through the metal landing gear and through the first hole in the wheel pant (the tapered side of the landing gear faces the rear of the plane). Slide another 2mm washer followed by a 2mm nut onto the screw. Fit a 1-1/2" [38mm] foam wheel onto the screw and push the tip of the screw through the other hole in the wheel pant. Straighten the pant on the landing gear and tighten the nut. Repeat this for the other wheel pant.

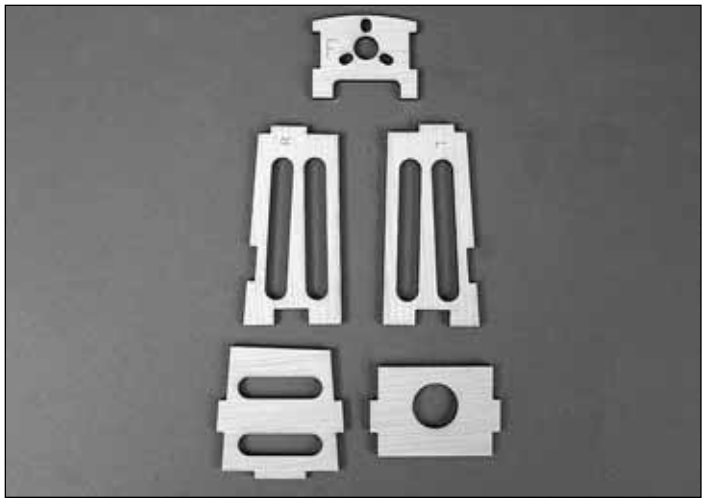


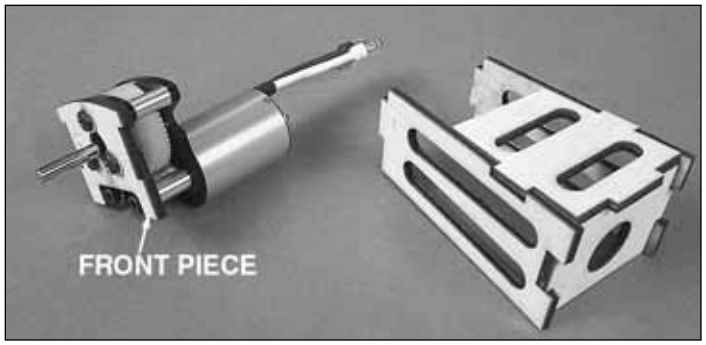
❏ 3. Trim the covering from the landing gear blind nuts on the underside of the fuselage. Using two 3 x 6mm SHCS, attach the landing gear to the fuse.

MOUNT THE MOTOR

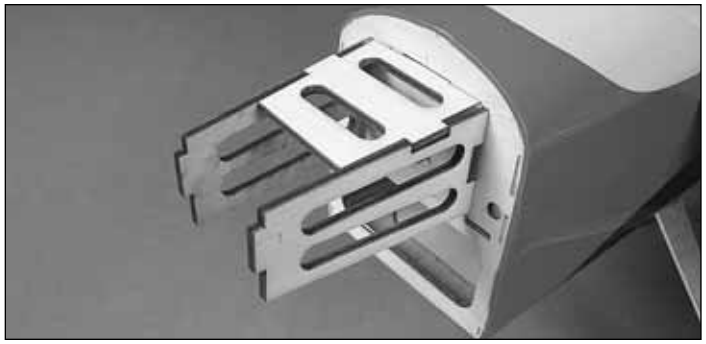
The Reactor 3D EP ARF includes motor mount boxes for both the Great Planes brushless C35-30-950 out-runner motor and the brushless B24-33-4040 in-runner equipped with the Great Planes 24mm gear-drive. Other motors may be able to be installed. However, modification to one of the mounting boxes would be necessary to suit the size and mount pattern of your equipment.

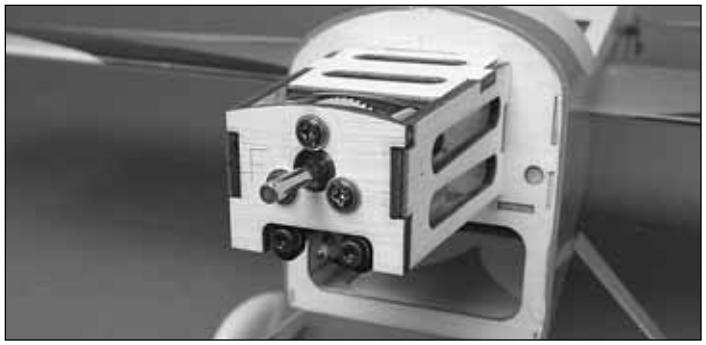
In-runner Brushless Motor with 24mm Gear-Drive





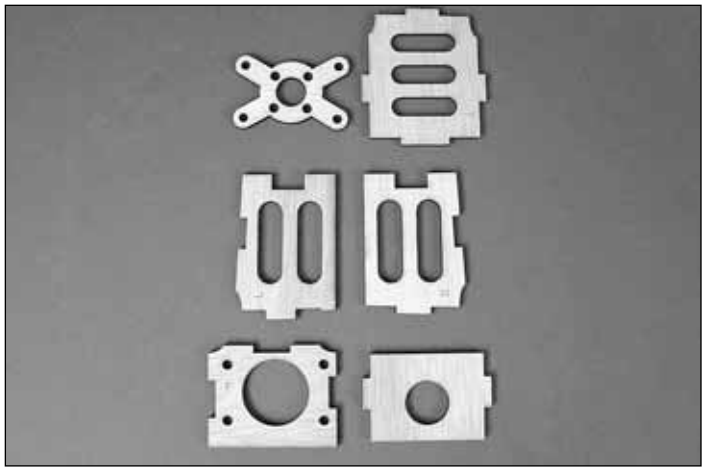
❏ 1. Locate the five pieces that make up the in-runner motor mounting box. These parts are labeled I1, I2, etc. Use medium CA to glue the sides, top, and back pieces together. The “R,” “L,” “T,” “B,” and “F” refer to right side, left side, top, back, and front. Be sure that these letters appear on the outside of the mounting box when assembled. Attach the front piece to the motor gearbox using three 3 x 6mm machine screws (included with the gearbox) and three 3mm washers.

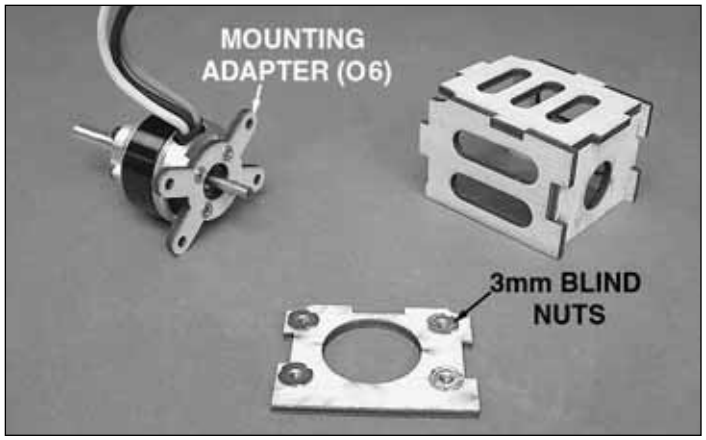




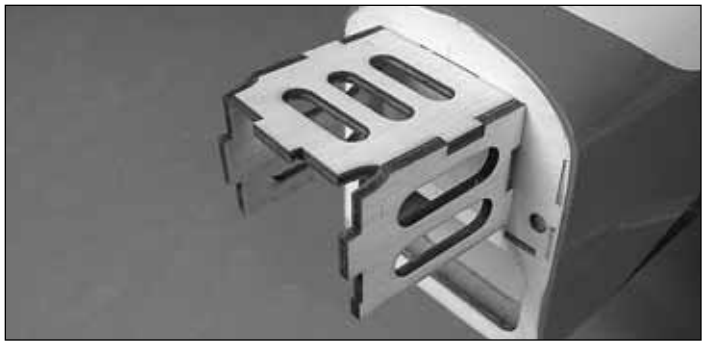
❏ 2. Glue the tabs on the back of the mounting box into the slots in the firewall, being sure that the mounting box back piece is flush against the firewall. Fit the motor leads through the hole in the firewall and glue the front plate to the mounting box with CA.

Out-runner Brushless Motor



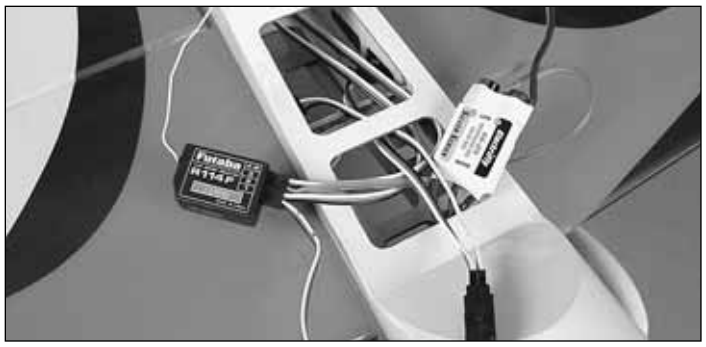


❏ 1. Locate the six pieces that make up the out-runner motor mounting box. These parts are labeled O1, O2, etc. Use medium CA to glue the sides, top, and back pieces together. The “R,” “L,” “T,” “B,” and “F” refer to right side, left side, top, back, and front. Be sure that these letters appear on the outside of the mounting box when assembled. Install four 3mm blind nuts into the mounting holes in the front plate. Secure the mounting adapter (O6) to the backside of your out-runner motor using the screws supplied with the motor.

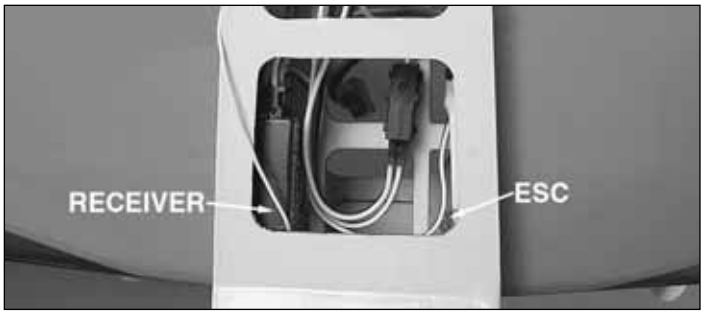


❏ 2. Glue the tabs on the back of the mounting box into the slots in the firewall, being sure that the mounting box back piece is flush against the firewall. Glue the front plate to the mounting box with CA. Using four 3 x 6mm machine screws and four 3mm washers, attach the mounting adapter to the front plate.

INSTALL THE RADIO & ESC

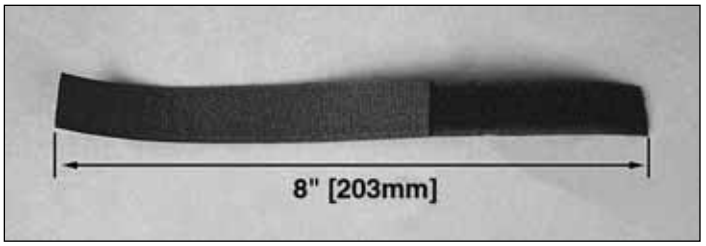


❏ 1. Trim the covering from the front lightening hole in the cockpit area of the fuselage. Connect the servo leads to the receiver. If you are using a 4-channel receiver, you will also need a dual servo extension or Y-harness for the aileron servos. Feed the motor leads on your ESC through the center hole in the firewall. Connect the ESC to the motor and to the receiver.



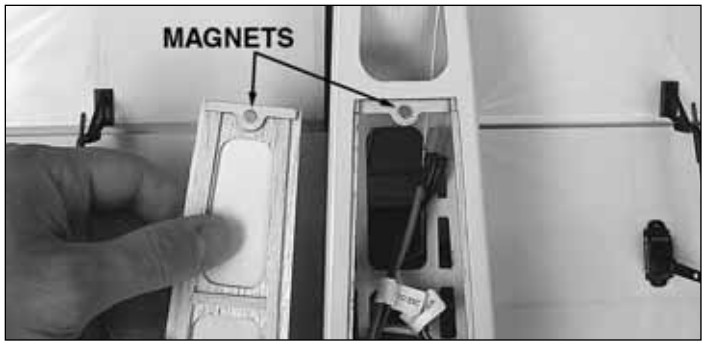
❏ 2. Brush on a small amount of epoxy onto the inside of the fuselage sides just behind the wing LE. This will provide a smooth surface to attach the ESC and receiver. When the epoxy has cured, cut pieces of adhesive-backed hook and loop material or double-sided servo tape (not included) to secure the receiver and ESC at these locations.

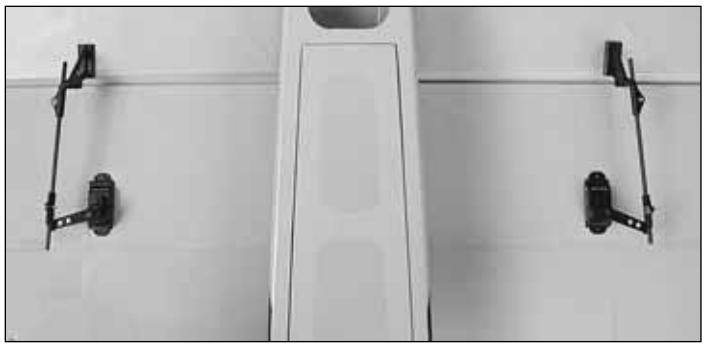
❏ 3. Route the receiver antenna out of the vent hole and down the underside of the fuselage. Use clear tape to hold the antenna in place.



❏ 4. Make a battery strap 8" [203mm] long by overlapping two pieces of hook and loop material and cutting it to length. Feed the battery strap through the battery tray in the location shown. Glue the battery strap to the battery tray to keep it in place.

❏ 5. Test fit your battery into place and adjust the battery strap as necessary. When you balance the model, the exact position of the battery pack must be determined. When you know where the battery pack will need to be to balance the model, mark its position onto the battery tray and put a piece of adhesive-backed hook and loop material onto the battery pack and battery tray to hold it in place during flight.



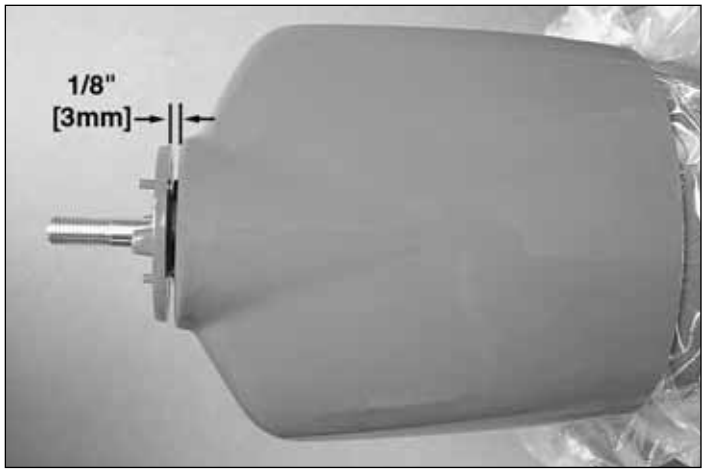


❏ 6. Glue a magnet into the **battery hatch door** and one in the fuselage in the location shown. Be sure that you glue the magnets with the correct side facing out so the magnets will attract each other when the hatch door is installed.

INSTALL THE COWL, CANOPY & SPINNER

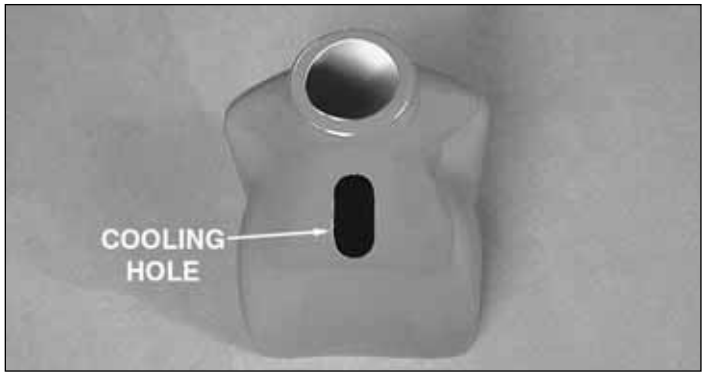
❏ 1. Prepare the inside of the **cowl** by lightly scuffing it with 220-grit sandpaper. When satisfied, clean the inside of the cowl with alcohol.

❏ 2. Glue the remaining magnets into the **cowl ring** and firewall, being sure that the magnets are aligned correctly so that they attract each other when the ring is installed. Cut a slit in the end of the bag that the fuselage was packaged in. Slide the bag over the motor and mounting box. Attach the cowl ring to the fuselage, sandwiching the bag in place. The bag is there to prevent epoxy from sticking to the fuselage in the next step.



❏ 3. Confirm that your spinner backplate properly fits your motor shaft. If not, ream or drill it to the correct diameter. Carefully apply several dots of epoxy around the inside perimeter of the cowl approximately 3/8" [9.5mm] from the back. Slide the cowl over the cowl ring onto the fuselage. Put the spinner backplate onto the motor shaft and align the front of the cowl even with the spinner backplate and allowing a 1/8" [3mm] gap between the cowl and backplate. Let the cowl sit undisturbed while the epoxy cures.

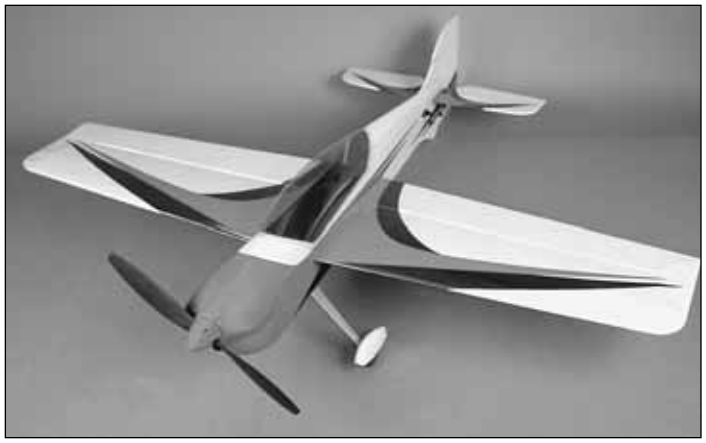
❏ 4. Carefully remove the cowl and the bag from the fuselage. Use a hobby knife to clean off most of the smeared epoxy on the inside of the cowl behind the cowl ring. Using medium CA, apply a fillet of glue around the **front** perimeter of the cowl ring, securing it to the cowl.



❏ 5. Using a hobby knife or rotary tool such as a Dremel, cut a cooling hole in the cowl below the spinner in the location shown.

❏ 6. If you wish to hide the cutouts you made in the covering over the cockpit area, we suggest using a trim sheet or decal sheet. We used a carbon fiber decal sheet from Parma (PARC1800). The instrument panel decal should be installed now before you install the canopy in the next step.

❏ 7. Align the canopy over the cockpit area on the fuselage. Use clear tape around the perimeter of the canopy to secure it.



❏ 8. Install the spinner and propeller onto the motor shaft.

Apply the Decals

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

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

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

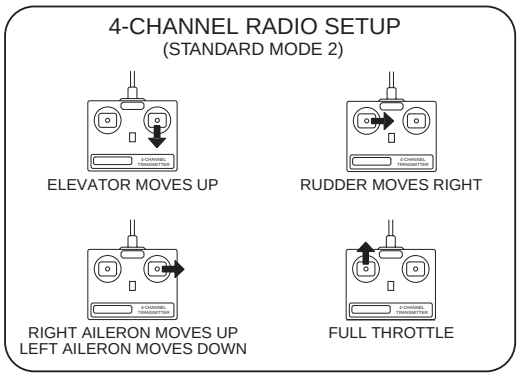
4. Use a piece of soft balsa or something similar to squeegee remaining water from under the decal. Apply the rest of the decals the same way.

GET THE MODEL READY TO FLY

Check the Control Directions

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

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



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

These are the recommended control surface throws:

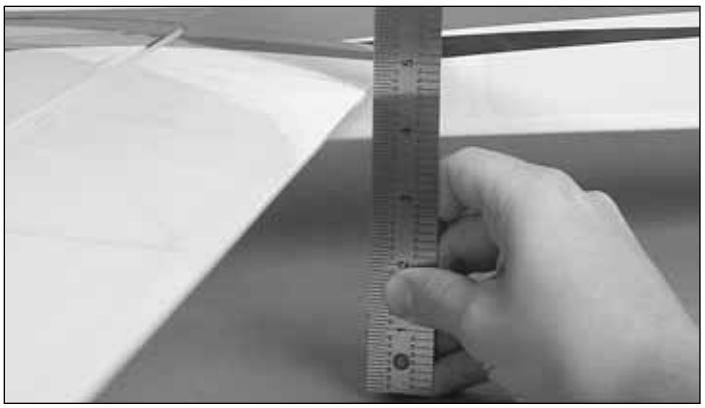
	High Rate	Low Rate
ELEVATOR:	7/8" [22mm] up 7/8" [22mm] down	9/16" [14mm] up 9/16" [14mm] down
RUDDER:	2-3/8" [60mm] right 2-3/8" [60mm] left	1-3/16" [30mm] right 1-3/16" [30mm] left
AILERONS:	1-3/8" [35mm] up 1-3/8" [35mm] down	3/4" [19mm] up 3/4" [19mm] down

3D RATES

3D ELEVATOR:	2" [51mm] up 2" [51mm] down
3D RUDDER:	3-1/2" [89mm] right 3-1/2" [89mm] left
3D AILERONS:	2-5/8" [67mm] up 2-5/8" [67mm] down

IMPORTANT: The Reactor 3D 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 Reactor 3D 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 difficult to control, so remember, “more is not always better.”

Set the Control Throws



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

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

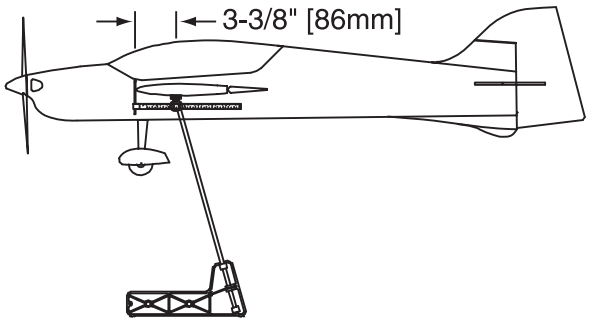
Balance the Model (C.G.)

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

❏ 1. Use a felt-tip pen or 1/8" [3mm]-wide tape to accurately mark the C.G. on the bottom of the wing on both sides of the fuselage. The C.G. is located 3-3/8" [86mm] back from the LE of the wing at the fuse.

This is where your model should balance for the first flights. Later, you may wish to experiment by shifting the C.G. up to 1/2" [13mm] forward or 1/2" [13mm] back to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but the model may then require more speed for takeoff and make it more difficult to slow for landing. Moving the C.G. aft makes the model more maneuverable, but could also cause it to become too difficult to control. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



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

❏ 3. If the tail drops, the model is "tail heavy" and the battery pack and/or receiver must be shifted to balance. If the nose drops, the model is "nose heavy" and the battery pack and/or receiver must be shifted aft 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 move the battery pack or receiver for the Reactor 3D EP ARF to balance, recheck the C.G. after this has been done.

Balance the Model Laterally

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

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

PREFLIGHT

Identify Your Model

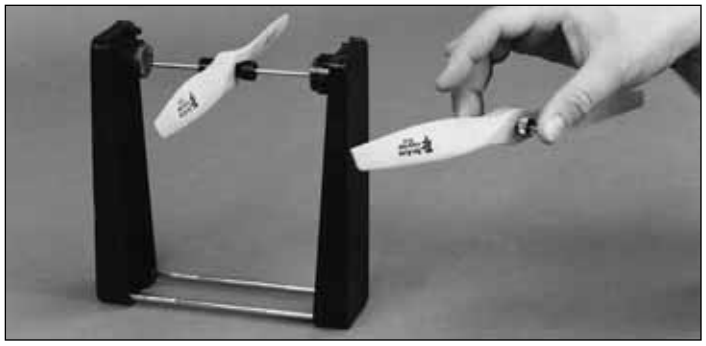
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification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



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

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

Range Check

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

Use safety glasses when running electric motors.

Do not operate 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 operate 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 gets hot! Do not touch it during or right after operation.

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.

- ❏ 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 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. Add a drop of oil to the axles so the wheels will turn freely.
- ❏ 6. Make sure all hinges are **securely** glued in place.
- ❏ 7. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- ❏ 8. Make sure that all servo arms are secured to the servos with the screws included with your radio.
- ❏ 9. Secure connections between servo wires and Y-connectors or servo extensions, and the connection between your battery pack and the on/off switch with vinyl tape, heat-shrink tubing or special clips suitable for that purpose.
- ❏ 10. Balance your propeller (and spare propellers).
- ❏ 11. Tighten the propeller nut and spinner.
- ❏ 12. Place your name, address, AMA number and telephone number on or inside your model.
- ❏ 13. If you wish to photograph your model, do so before your first flight.
- ❏ 14. Range check your radio when you get to the flying field.

FLYING

The Reactor 3D EP ARF is a great-flying model that flies smoothly and predictably. The Reactor 3D 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

If you have access to a smooth, paved runway, we suggest using it to takeoff, especially for the first few flights. Position the Reactor 3D EP ARF onto the runway pointed into the wind. Slowly advance the throttle stick to half throttle leaving the elevator in the neutral position. As the tail rises off the ground, slowly increase throttle and apply a bit of up elevator to lift the model into the air. As you become accustom to the takeoff characteristics of the Reactor, they can be performed quickly only requiring five to ten feet of runway until the model is airborne.

If you do not have access to a smooth runway, the Reactor 3D EP ARF can be hand launched. For the first flight, it is a good idea to have someone launch the airplane for you. This allows you to keep your hands on the radio sticks and correct any trim problems that are present.

Have the person launching the Reactor 3D EP ARF hold the plane by the fuselage just below the canopy. Throttle up to full power, and have your helper give the plane a gentle underhanded toss at about a 30° angle upward into the wind. The high thrust to weight ratio will allow the plane to accelerate to flying speed almost instantly. Climb to a comfortable altitude and throttle back to a lower power setting.

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 Reactor 3D 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 charge, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how 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 fuel level, but use this first flight to become familiar with your model before landing.

Landing

To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (into the wind) keeping the nose down to maintain airspeed and control. Level the attitude when the model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and climb out to make another attempt. When you're ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, hold up elevator to place the tail on the ground, regaining tail wheel control.

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

Make a copy of this identification tag and put it on or inside your model.

ALSO AVAILABLE FROM GREAT PLANES

ElectriFly by Great Planes Ammo 24-33-4040kV Brushless In-Runner Motor
Brushless, slotless Ammo In-runner motors offer almost twice the efficiency of brushed motors, more value than other In-runners and the advantage of a 2-year Satisfaction Guarantee. Ideal for both direct- or gear-drive use, Ammo motors offer an incredible power-to-weight advantage for everything from indoor flyers to giant-scale stars. Powered by rare-earth Neodymium magnets for premium performance and unmatched heat resistance, they're highly efficient and virtually maintenance-free. Bearings are double-shielded and there are no brushes to burn out. Installed, gold-plated bullet connectors are compatible with brushless ElectriFly ESCs. **GPMG5165**

GREAT PLANES® MODEL MANUFACTURING COMPANY

BUILDING NOTES

Kit Purchased Date: _____

Where Purchased:_____

Date Construction Started: _____

Date Construction Finished: _____

Finished Weight: _____

Date of First Flight: _____

FLIGHT LOG