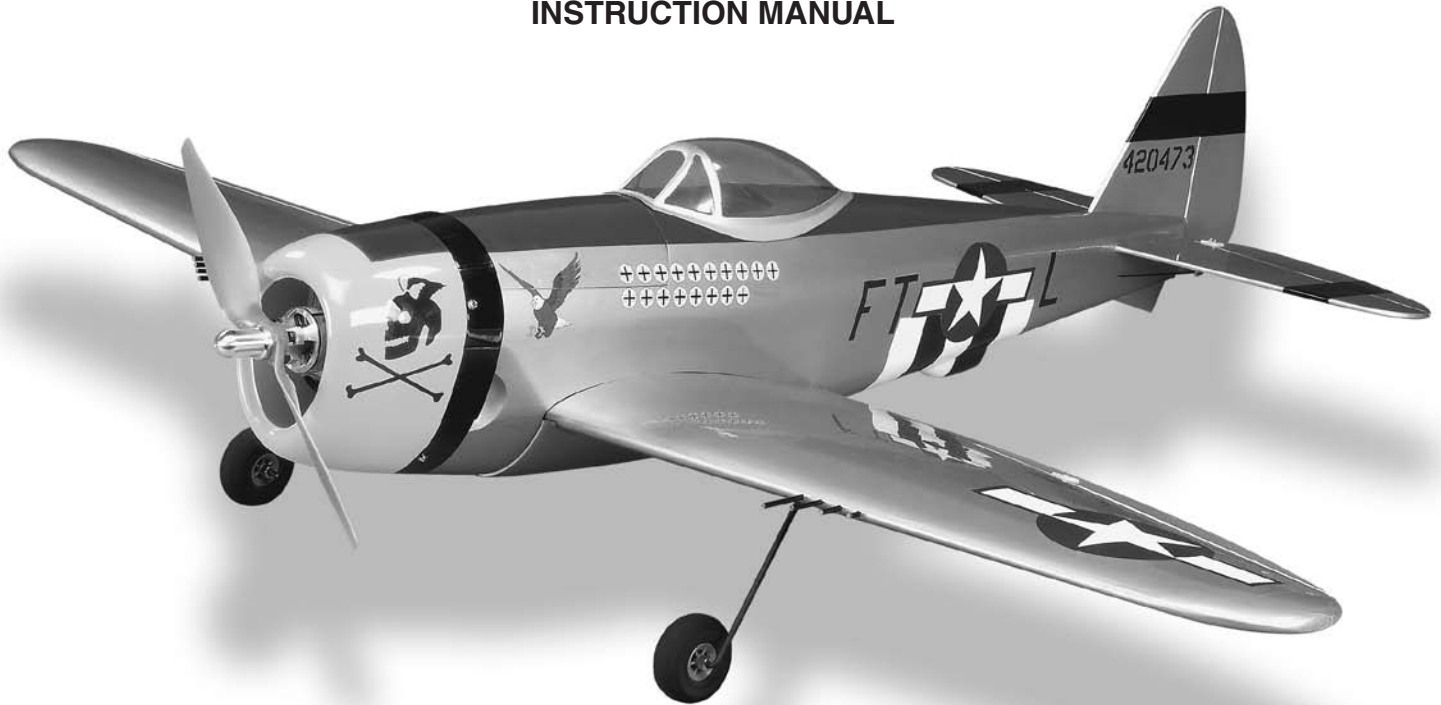


# P-47 THUNDERBOLT

## INSTRUCTION MANUAL



**Wingspan:** 39.5 in [1005 mm]  
**Length:** 34 in [865 mm]  
**Wing Area:** 290 sq in [18.7 dm<sup>2</sup>]  
**Weight:** 41-45 oz [1160-1275 g]  
**Wing Loading:** 20.4-22.3 oz/sq ft [62-68 g/dm<sup>2</sup>]  
**Engine:** .25 cu in [4cc] 2stroke, .30 cu in [5cc] 4-stroke  
**Motor:** 35-36-1200KV brushless out-runner motor with Silver Series 45A ESC.  
**Radio:** 4-5 channel transmitter, 4-5 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.



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

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## INTRODUCTION

Congratulations on your purchase of one of the Great Planes Combat Class #2610 Fighters! The Combat P-47 ARF is a great flying model and is suitable for both combat flying and sport flying. Accommodations have been provided for both a glow engine and a brushless out-runner motor. The optional landing gear gives the sport flyer the comfort of landing on paved runways.

For the latest technical updates or manual corrections to the Combat P-47 ARF visit the Great Planes web site at [www.greatplanes.com](http://www.greatplanes.com). Open the "Airplanes" link, and then select the Combat P-47 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

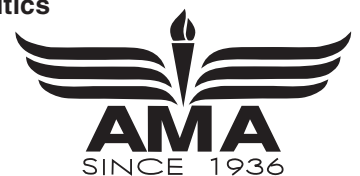
Muncie, IN 47302-9252

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 Combat P-47 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 Combat P-47 ARF, if not assembled and

operated correctly, could possibly cause injury to yourself or spectators and damage to property.

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

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

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

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

6. You must check the operation of the model before **every** flight to 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 an engine larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

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

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

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

## DECISIONS YOU MUST MAKE

This is a partial list of items required to finish the Combat P-47 ARF that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

### Radio Equipment

The Combat P-47 ARF requires a minimum 4-channel radio system with four 35 oz.-in. [2.5 kg-cm] minimum micro servos. If you are installing a glow engine, an additional micro servo is required for the throttle.

In addition, two 9" [229mm] servo extensions are required for the aileron servos. If you are using a radio system that does not support mixing functions, a Y-harness will also be required to connect the aileron servos to the receiver. If using an electric motor, a 6" extension will be needed for the ESC. Recommended part numbers are provided below:

- 4 or 5 Futaba S3115 Servo Micro Precision (FUTM0415)
- 2 Futaba 9" [229mm] Servo Extensions (FUTM3910)
- Futaba 6" [152mm] Servo Extension J (HCAM2000)
- Futaba 6" [152mm] Dual Servo Extension J (FUTM4130)

### Power System Recommendations

The recommended engine/motor size for the Combat P-47 ARF is a .25 two-stroke engine or a RimFire™ C35-36-1200kV brushless outrunner motor. Engine and motor order numbers are provided below:

- O.S.® .25 FX Non-Ringed w/Muffler (OSMG0525)
- Great Planes RimFire .15 OutRunner Brushless Motor (GPMG4620)

If using the recommended brushless motor, the Great Planes SS-45 brushless ESC is required. Bullet connector adapters are also required. The adapters can be purchased pre-assembled, or the individual components can be purchased to make your own.

- Great Planes Silver Series 45A Brushless ESC 5V/2A BEC (GPMM1840)
- Great Planes 4mm Male to 3.5mm Female Bullet Connector Adapters (GPMM3123)

If you wish to make your own adapters, the following part numbers will be needed:

- Great Planes Gold Plated Bullet Connectors Female 3.5mm (GPMM3113)

- Great Planes Gold Plated Bullet Connectors Male 4mm (GPMM3114)
- W.S. Deans Racing Silver Solder 1 oz. (WSDC4030)
- Hobbico® Soldering Iron 60 Watt (HCAR0776)

## **Batteries and Charger**

For a brushless motor installation, a 3200mAh 11.1V Lithium Polymer battery pack is recommended. The order number for the battery pack is provided below:

- Great Planes LiPo 3200mAh 11.1V 20C Discharge w/ Balance (GPMP0623)

A cell balancer is required for the LiPo battery pack listed above:

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

A suitable charger is also required. The Great Planes PolyCharge4™ is designed for LiPo packs only and 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, LiPo, and Pb acid 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)

## **ADDITIONAL ITEMS REQUIRED**

### **Required Hardware and Accessories**

This is the list of hardware and accessories required to finish the Combat P-47 ARF. Order numbers are provided in parentheses:

- R/C foam rubber (1/4" [6mm] - HCAQ1000, or 1/2" [13mm] - HCAQ1050)
- 3' [900mm] standard silicone fuel tubing (GPMQ4131)

### **Adhesives and Building Supplies**

This is the list of Adhesives and Building Supplies that are required to finish the Combat P-47 ARF:

- 1/2 oz. Thin Pro™ CA (GPMP6001)
- 1/2 oz. Thick Pro CA- (GPMP6013)

- 1/2 oz. Medium Pro CA+ (GPMP6007)
- Pro 30-minute epoxy (GPMP6047)
- Masking tape (TOPR8018)
- Threadlocker thread locking cement (GPMP6060)
- Denatured alcohol (for epoxy clean up)
- Drill bits: 1/16" [1.6mm], 5/64" [2mm], 1/8" [3.2mm], 5/32" [4mm]
- Great Planes 10-Piece Metric Tap & Drill Set (GPMP8118) (3mm tap & drill is needed)
- Tap handle (GPMP8120)
- R/C-56 canopy glue (JOZR5007)
- Small metal file
- #1 Hobby knife (HCAR0105)
- #11 blades (5-pack, HCAR0211)
- Medium T-pins (100, HCAR5150)
- Top Flite® MonoKote sealing iron (TOPR2100)
- Top Flite Hot Sock™ iron cover (TOPR2175)

## **Optional Supplies and Tools**

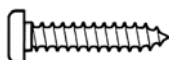
Here is a list of optional tools that will help you build the Combat P-47 ARF:

- 2 oz. spray CA activator (GPMP6035)
- 4 oz. aerosol CA activator (GPMP6034)
- CA applicator tips (HCAR3780)
- CA debonder (GPMP6039)
- Pro 6-minute epoxy (GPMP6045)
- Epoxy brushes 6, (GPMP8060)
- Mixing sticks (GPMP8055)
- Mixing cups (GPMP8056)
- Pliers with wire cutter (HCAR0630)
- Hobbico Duster™ can of compressed air (HCAR5500)
- Switch & Charge Jack Mounting Set (GPMM1000)
- Panel Line Pen (TOPQ2510)
- Rotary tool such as Dremel® (DRER0550)
- Rotary tool reinforced cut-off wheel (GPMP8020)
- Servo horn drill (HCAR0698)
- Hobby Heat™ micro torch (HCAR0750)
- Dead Center™ Engine Mount Hole Locator (GPMP8130)
- Precision Magnetic Prop Balancer (TOPQ5700)
- AccuThrow™ Deflection Gauge (GPMP2405)
- CG Machine™ (GPMP2400)
- Hobbico Flexible 18" Ruler Stainless Steel (HCAR0460)
- Top Flite MonoKote trim seal iron (TOPR2200)
- Top Flite MonoKote heat gun (TOPR2000)
- Hobbico Pin Vise 1/16 Collet w/6 Bits (HCAR0696)
- Hobbico 8-Piece Ball Tip Hex L Wrench SAE (HCAR0520)
- Hobbico 7-Piece Ball Tip Hex L Wrench Metric (HCAR0521)
- Great Planes Clevis Installation Tool (GPMP8030)
- X-Acto® Extra Hands Double Clip (XACR4214)

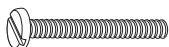
## IMPORTANT BUILDING NOTES

- There are two types of screws used in this kit:

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



**Machine screws** are designated by a number, threads per inch, and a length. For example, 4-40 x 3/4" [19mm].



**Socket Head Cap Screws (SHCS)** are designated by a number, threads per inch, and a length. For example, 4-40 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**, and 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](http://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](mailto:airsupport@greatplanes.com)

## ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes Combat P-47 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](http://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

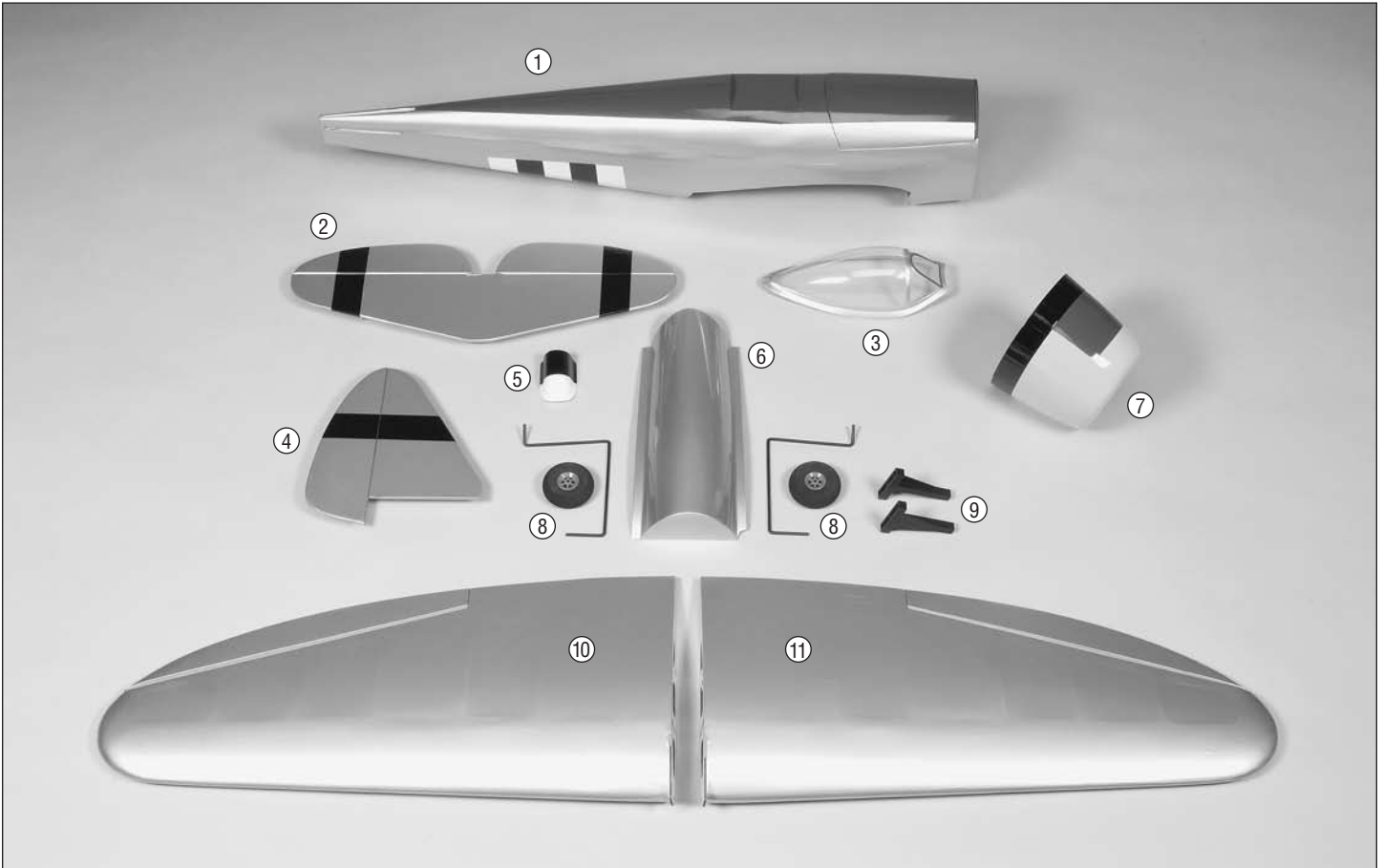
Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

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

### REPLACEMENT PARTS LIST

Order Number	Description	How to purchase
	Missing pieces	Contact Product Support
	Instruction manual	
	Full-size plans	Not available
GPMA3208	Wing Set P-47 .25 GP/EP ARF	Contact your hobby supplier to purchase these items
GPMA3209	Fuse Kit P-47 .25 GP/EP ARF	
GPMA3210	Tail Set P-47 .25 GP/EP ARF	
GPMA3211	Belly Pan P-47 .25 GP/EP ARF	
GPMA3212	Cowl P-47 .25 GP/EP ARF	
GPMA3213	Canopy P-47 .25 GP/EP ARF	
GPMA3214	Landing Gear P-47 .25 GP/EP ARF	
GPMA3215	Decal Set P-47 .25 GP/EP ARF	
GPMA3216	Spinner Nut P-47 .25 GP/EP ARF	
GPMA3226	Battery Hatch P-47 .25 GP/EP ARF	
GPMA2827	Engine Mount	

## KIT CONTENTS



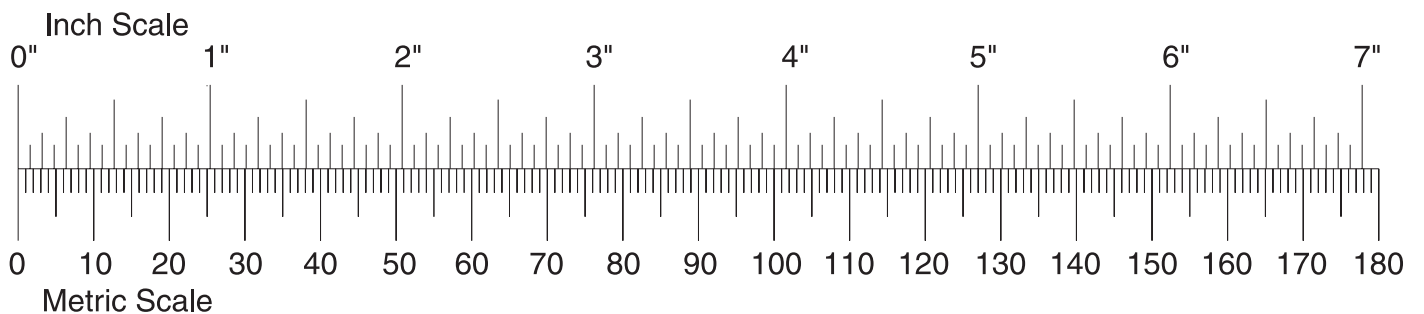
### Kit Contents

- |  |                            |                                  |
|--|----------------------------|----------------------------------|
| 1. Fuselage and hatch                  | 5. Air scoop               | 9. Engine mount                  |
| 2. Horizontal stabilizer and elevators | 6. Belly pan               | 10. Right wing panel and aileron |
| 3. Canopy                              | 7. Cowl                    | 11. Left wing panel and aileron  |
| 4. Vertical stabilizer and rudder      | 8. Landing gear and wheels |                                  |

## COMMON ABBREVIATIONS

- |                              |                                |
|------------------------------|--------------------------------|
| Fuse = Fuselage              | Ply = Plywood                  |
| Stab = Horizontal Stabilizer | “ = Inches                     |
| Fin = Vertical Stabilizer    | in = Inches                    |
| LE = Leading Edge            | mm = Millimeters               |
| TE = Trailing Edge           | ESC = Electronic Speed Control |
| LG = Landing Gear            | LiPo = Lithium Polymer Battery |

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



## PREPARATIONS

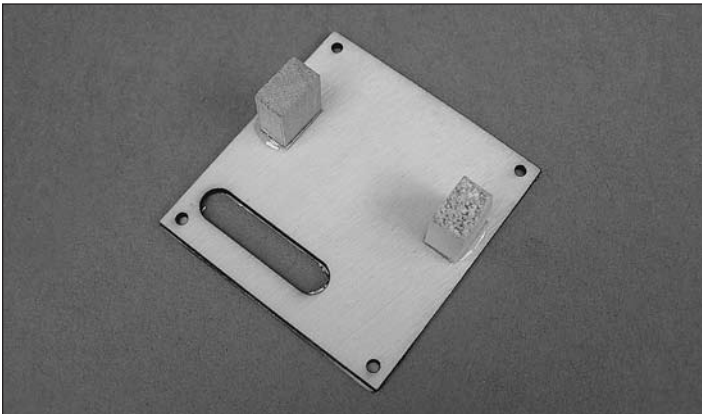
❑ 1. If you have not done so already, remove the major parts of the kit from the box and inspect for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the "Kit Inspection" section on page 5.



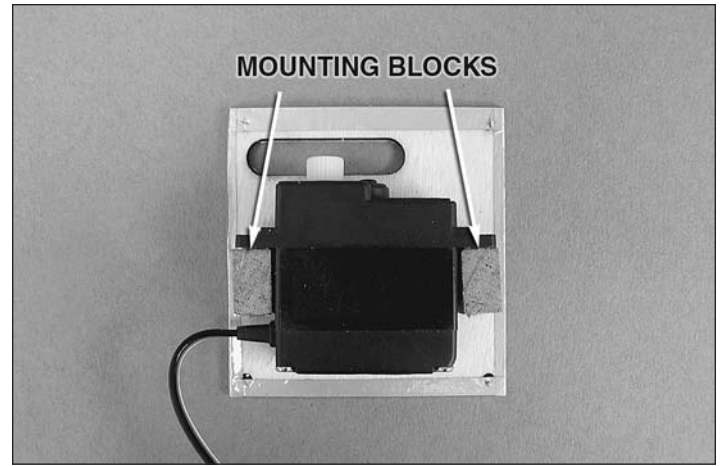
❑ 2. Remove the tape and separate the aileron servo hatches from the wing. Use a covering iron with a covering sock to tighten the covering if necessary. Apply pressure over sheeted areas to **thoroughly** bond the covering to the wood.

## BUILD THE WING

### Install the Aileron Servos and Pushrods

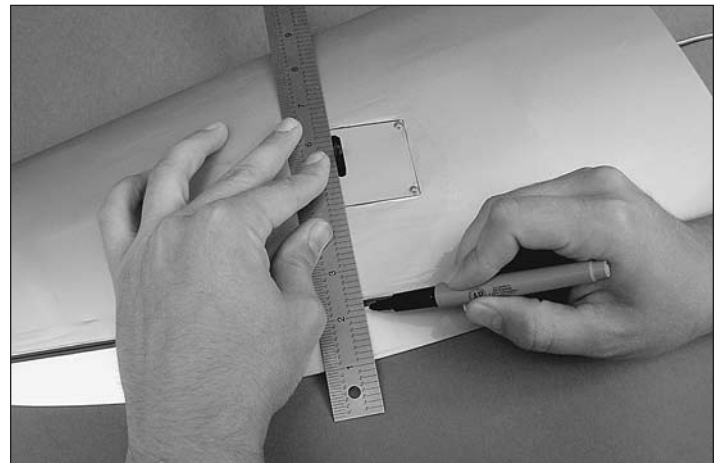


❑ ❑ 1. Locate the servo hatch from the underside of the wing that was set aside and the four 1/2" x 15/64" x 3/8" [12.7mm x 6mm x 9.5mm] blocks of wood. These will be used to hold the aileron servos to the servo hatch. The location of the servo blocks has been marked for you on the underside of the aileron servo hatch. If you are using a different servo from the recommended Futaba S3115, you will need to verify these markings are in the appropriate location for your servo. Glue the mounting blocks to the underside of the hatch using 6 minute epoxy.



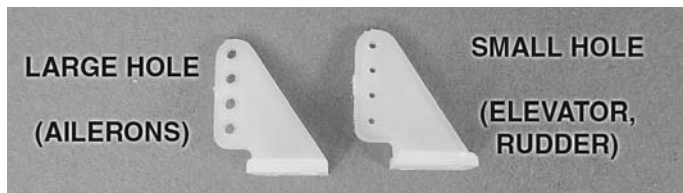
❑ ❑ 2. Place the servo onto the hatch in the location it is going to be mounted. Mark the center of each of the servo mounting holes on the blocks. Using a 1/16" (1.6mm) drill bit, drill a pilot hole in the location of the mark. Install the rubber grommets and eyelets that were included with the servo, and mount the servo to the blocks using the servo screws included with the servo. Remove the servo screw and servo, and apply two drops of thin CA to the holes. Allow a few moments for the glue to cure. Once the glue has cured, center the servo, using the radio, and install the servo using the hardware provided with the servo. Remove the extra arms from the servo horn.

❑ ❑ 3. Locate a 9" [229mm] servo extension and attach it to the aileron servo. Secure the extension using a length of 3/8" [9.5mm] heat shrink tubing, or electrical tape. Look inside the wing and locate the string. Tie the end of the string to the end of the extension. The other end of the string is taped to the root of the wing half. Using the string, guide the servo extension through the wing and out of the wing root. Untie the string from the servo extension and feed the end of the servo extension through the hole located in the top of the wing.

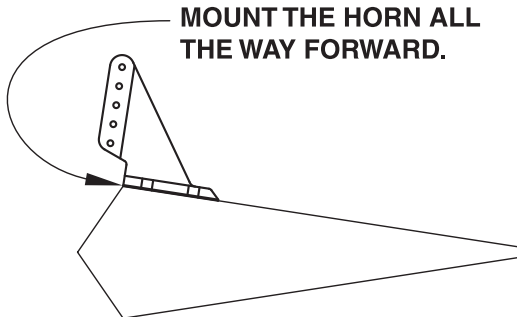


❑ ❑ 4. Install the aileron servo hatch using four of the 2mm wood screws provided. Hold a straight edge flush with the top of the servo arm and mark where the ruler intersects the aileron leading edge.

## CONTROL HORNS



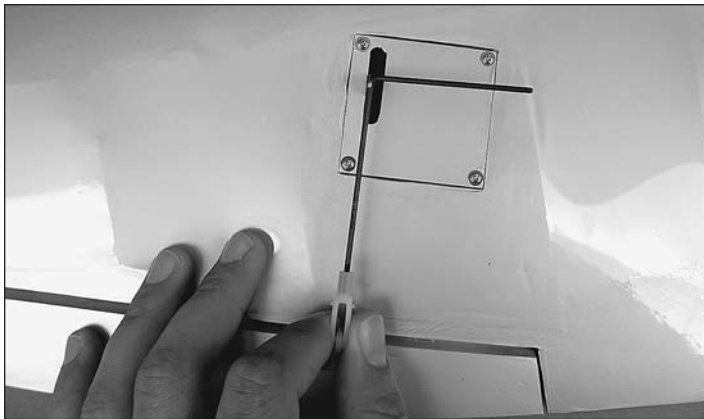
Please note that there are two different types of control horns included. The control horns with the **larger holes** are meant for use with the **Aileron** pushrod clevises. The control horns with the **smaller holes** are meant for use with the **Elevator** and **Rudder** z-bends.



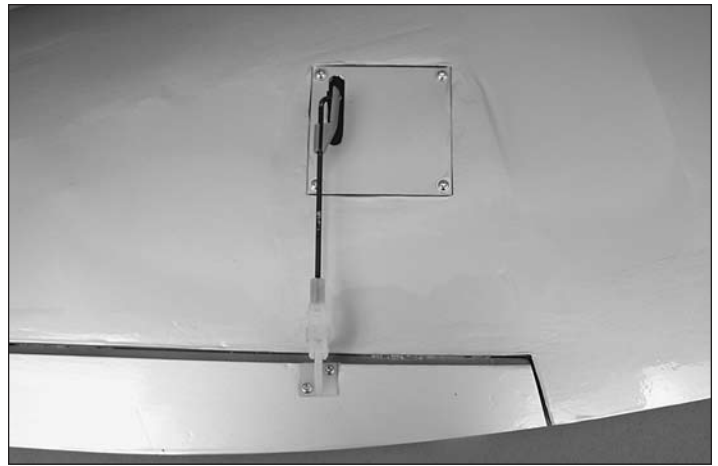
❑ ❑ 5. Place the large hole aileron control horn on the aileron, centering it on the mark you made in step 15. Use a T-pin to mark the center of the holes. Use a 5/64" [2mm] drill bit to drill into the aileron at the markings you just made. Remove the mark you made on the aileron using some denatured alcohol and a paper towel.

❑ ❑ 6. Install the control horns using two 2 x 15mm [5/8"] machine screws and the control horn back plates. The ends of the screws can be cut flush with the back plates using diagonal pliers or a rotary tool.

❑ ❑ 7. Locate the 2 aileron pushrods, 2 nylon clevises, and 2 nylon FasLinks™. Screw the clevis onto the threaded end of the pushrod by rotating the clevis 18 complete revolutions. A Great Planes 4-in-1 Installation Tool (GPMR8035) makes this task much easier.



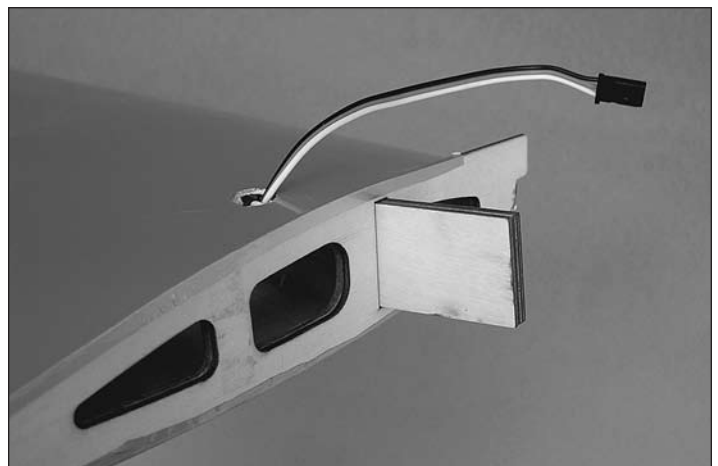
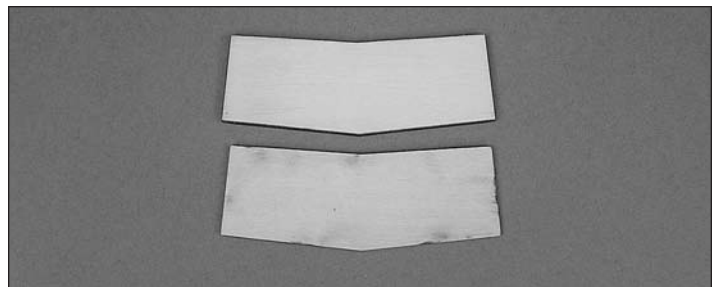
❑ ❑ 8. Place the clevis in the control horn without snapping it shut. Center the aileron and mark the center of the servo arm on the pushrod. Remove the clevis from the horn and make a 90 degree bend in the pushrod at the mark. Using a 5/64" [2mm] drill bit, enlarge the outer servo horn hole.



❑ ❑ 9. Place a silicone clevis keeper on the pushrod. Then place a FasLink™ on the pushrod and remove the excess pushrod with a rotary tool or diagonal pliers. Connect the clevis to the control horn but do not snap in place. Connect the bent end to the servo. Re-center the servo and adjust the linkage by screwing the clevis either in or out until the aileron is straight. Once the aileron is straight, snap the clevis in place. Attach the FasLink™ and slide the clevis keeper over the clevis.

❑ 10. Repeat steps 1-9 for the other wing.

## Join the Wing



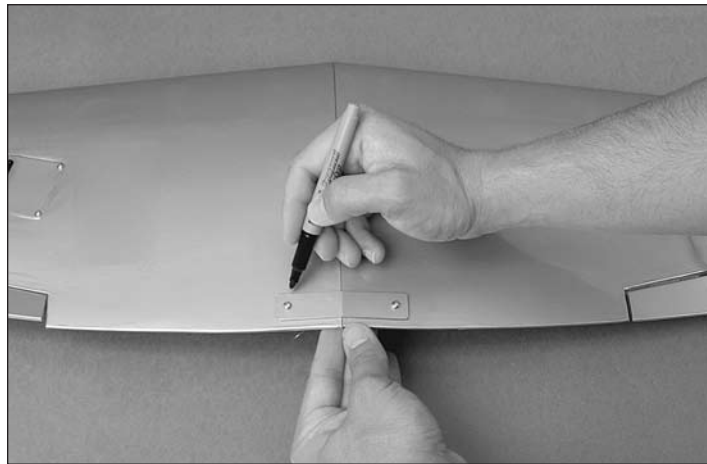
❑ 1. Locate the two plywood **wing joiners**. Place them on top of each other and test fit them into both wing halves. The joiners should fit slightly loose to allow room for epoxy. If the joiner is too snug, sand the joiners until they fit properly.



❑ 2. Note: Before beginning this step be sure to have plenty of alcohol and paper towels handy to clean up any excess epoxy. Mix approximately 1/2 oz [15cc] of 30-minute epoxy. Apply a liberal amount of epoxy into the joiner pocket of each wing, both sides of each wing joiner, and the root rib of each wing. Insert the joiner into one wing panel and then slide the other panel onto the joiner. Push the two halves together firmly, making sure there are no gaps anywhere between the wings. Clean any excess epoxy from the wing surface with alcohol. Hold the wings together with masking tape until the epoxy has completely cured.



❑ 4. Remove the wing bolt plate. Trim the covering just inside your lines. Wipe away the lines with alcohol. Glue the wing bolt plate to the wing, using 6 minute epoxy or thick CA.



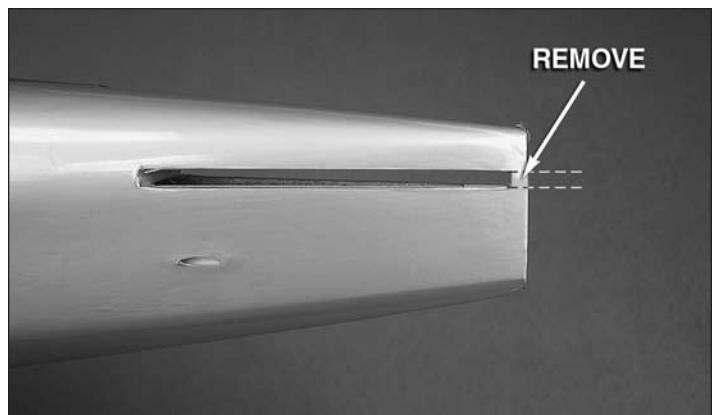
❑ 3. Align the wing bolt plate over the holes on the underside of the wing. There is a shallow perforation on the uncovered side of the plate to allow you to bend the plate to match the dihedral of the wing. Place the wing bolt plate over the underside of the wing and place the wing bolts into the two holes to keep the plate aligned. Use a fine, felt-tip marker to trace around the plate onto the wing.

## BUILD THE FUSELAGE

### Install the Horizontal Stabilizer and Vertical Fin



❑ 1. To properly align the stabilizer in the fuse, the wing will need to be temporarily installed. Attach the wing using the two 3 x 25mm [1"] machine screws and two 3mm flat washers.



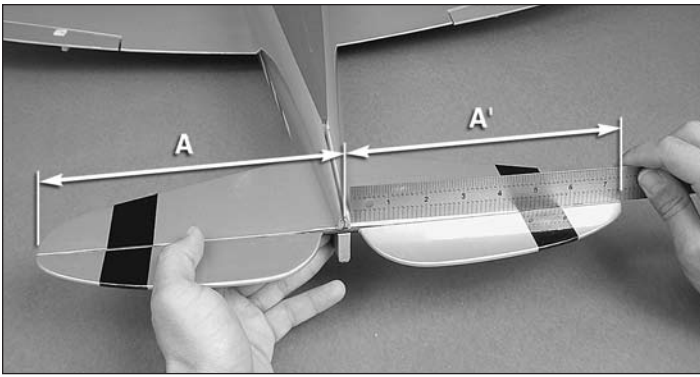
❑ 2. Remove the strip of balsa at the tail of the horizontal stabilizer slot in the fuselage using a hobby knife, as shown.

**EXPERT TIP**  
EXPERT TIP

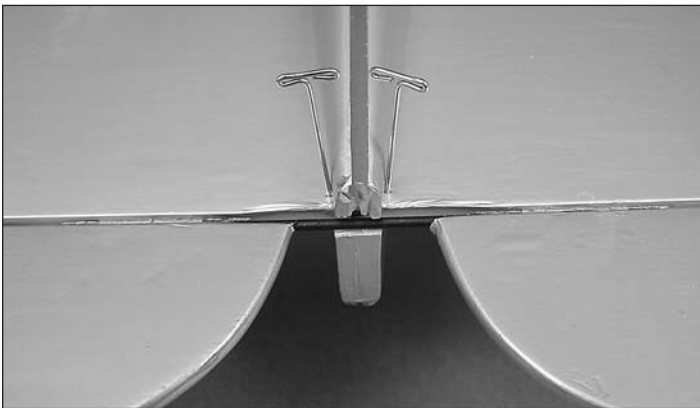
**HOW TO CUT COVERING FROM Balsa**

Use a soldering iron to cut the covering from the area beneath the wing bolt plate. 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.

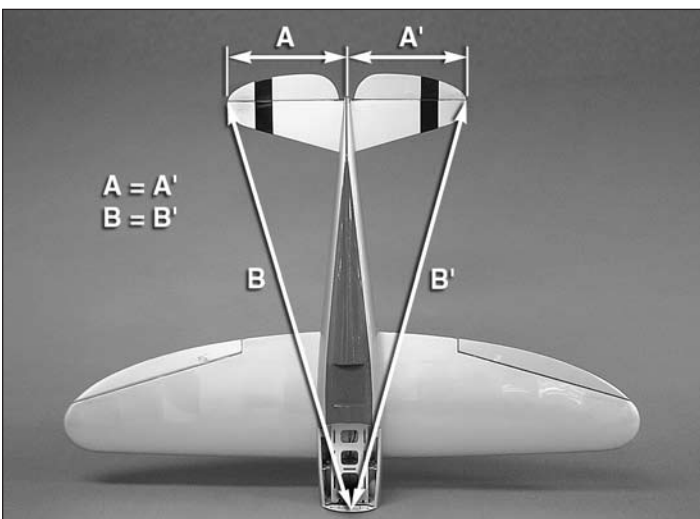
Use a straightedge to guide the soldering iron at a rate that will just melt the covering and not burn into the wood. The hotter the soldering iron, the faster it must travel to melt a fine cut. Peel off the covering.



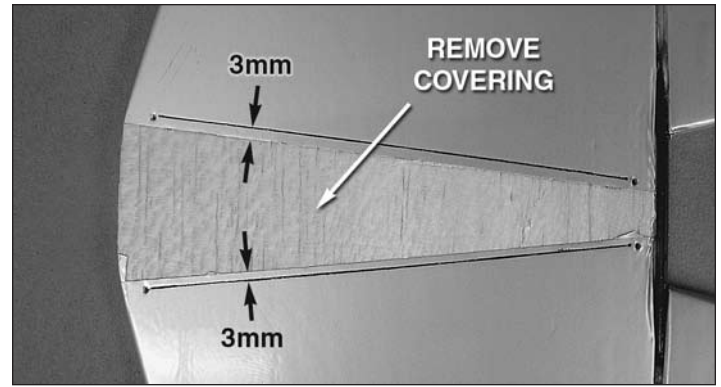
❑ 3. Locate the horizontal stabilizer and slide it through the slot in the fuselage. Using a ruler, center the trailing edge of the stabilizer by measuring from the fuselage to the tip of the stabilizer on both sides.



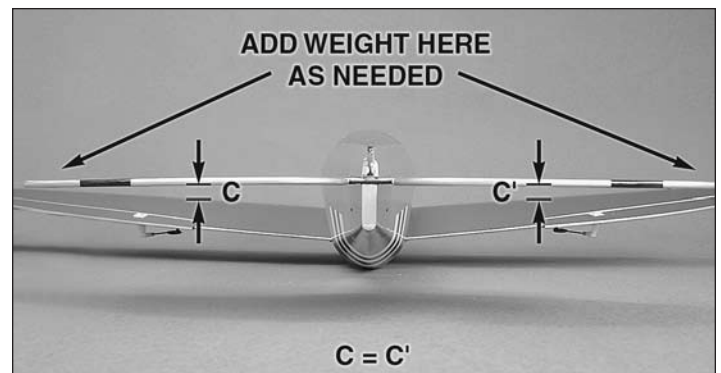
❑ 4. Once the trailing edge of the stabilizer has been centered, insert a T-pin in both sides of the trailing edge as shown. This will hold the trailing edge in place while it is aligned with the fuselage.



❑ 5. A mark has been provided in the center of the front former. Insert a T-pin on this mark, attach a string or a tape measure to the T-pin, and adjust the horizontal stabilizer by rotating it until the distance to either side of the trailing edge is equal. Once you are satisfied that the horizontal stabilizer is aligned correctly, as shown, place a T-pin in the leading edge of the stabilizer to mark where it intersects the fuselage.

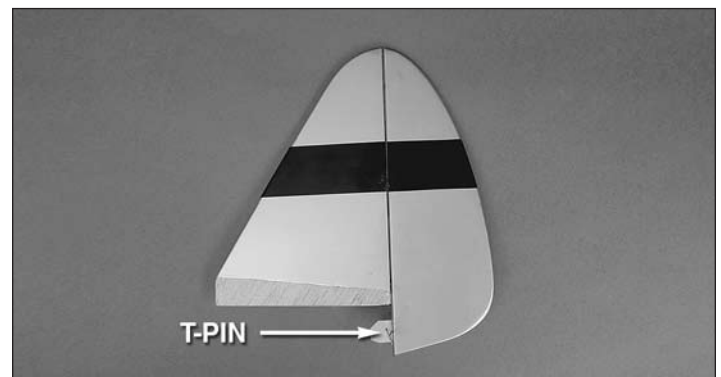


❑ 6. Remove the T-pins and the stabilizer. Using a straight edge, connect the marks you made with the T-pins. The covering slightly inside the marks should be removed. If there is more than 5/32" [3mm] of covering in between the marks and the already cut portion of the covering, remove that section of the covering. Be careful not to cut into the wood when removing the covering.



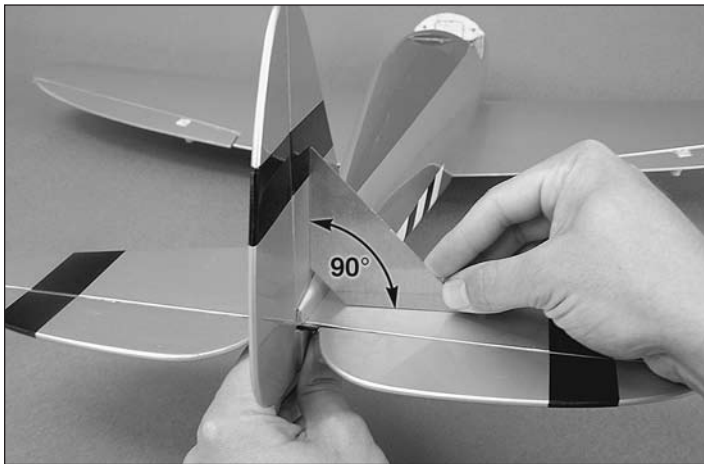
❑ 7. Place some oil or petroleum jelly on the elevator joiner and insert the stabilizer into the fuselage. Reinsert the T-pins into the trailing edge of the stabilizer. View the stabilizer standing approximately 6' [2.5m] behind the airplane. Make sure the horizontal stabilizer and the wing are aligned. If they are not, add weight to the high side of the horizontal stabilizer. Re-measure the horizontal stabilizer (steps 3 & 5) to be certain nothing has shifted.

❑ 8. Once you are certain everything is aligned properly, use some thin CA glue or epoxy to glue the stabilizer in place.



❑ 9. Locate the CA hinge. Insert a T-pin into the center of the hinge. Insert one half of the hinge into the bottom portion of the rudder, as shown.

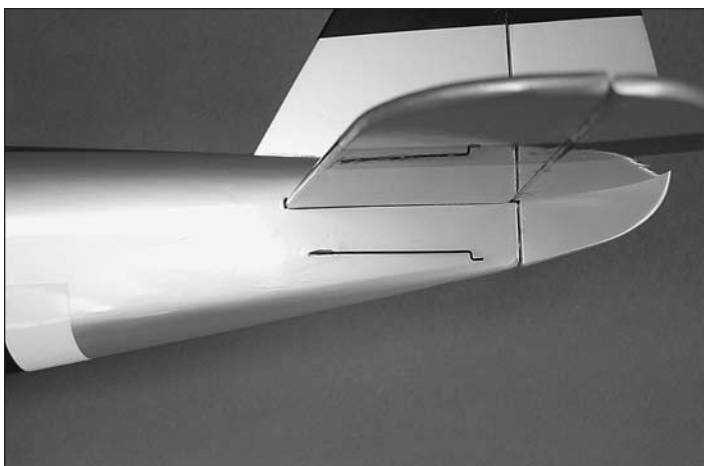
❑ 10. Insert the vertical stabilizer into the slot in the fuselage. When you slide the vertical into place, slide the other half of the rudder hinge into the bottom of the fuselage. Once the vertical stabilizer has been inserted into the fuselage and the rudder hinge is in place, remove the T-pin from the rudder hinge.



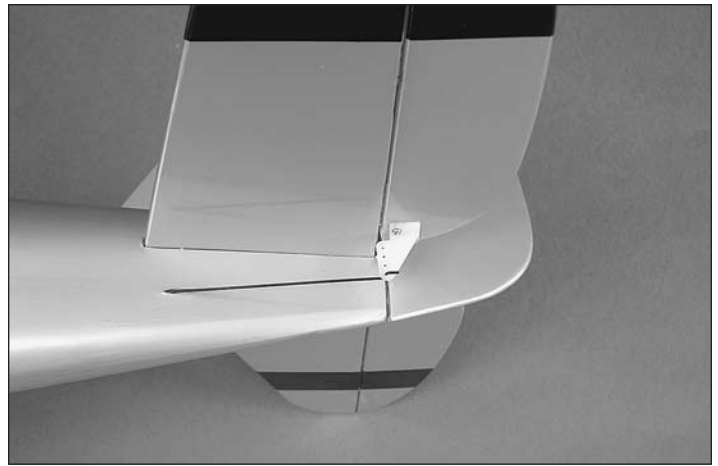
❑ 11. Use a builder's triangle to be sure the vertical stabilizer is at a 90 degree angle with the horizontal stabilizer. If it is not, apply masking tape to the fuselage and to the tip of the vertical stabilizer to gently position it. Once you are certain the alignment is correct, use thin CA or epoxy to glue the stabilizer in place. Allow a few minutes for the glue to cure and then remove the tape.

❑ 12. Add six drops of thin CA glue to each side of the rudder hinge you installed. Allow a few minutes for the glue to cure. Free the rudder hinge by flexing it.

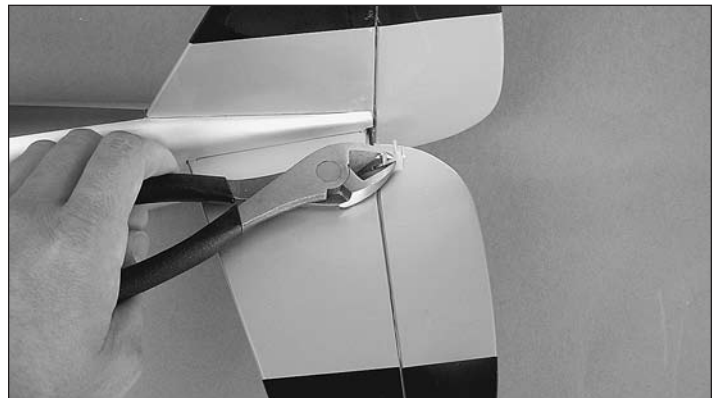
### ***Install the Elevator and Rudder Pushrods and Servos***



❑ 1. Insert one of the 19-3/4" [502mm] long pushrod wires through the left pushrod exit slot into the fuselage.



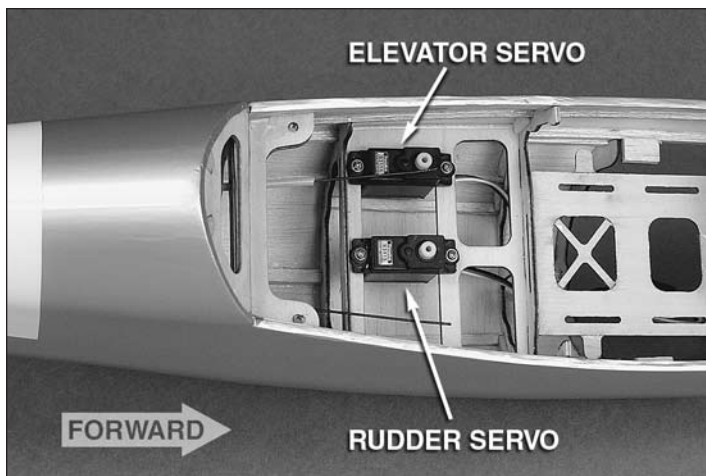
❑ 2. Hook a small hole nylon control horn onto the Z-bend in the pushrod wire. Align the control horn onto the underside of the left elevator half and position the holes over the hinge line, matching the angle of the pushrod. When satisfied, mark the locations for the control horn mounting screws. Drill the holes using a 5/64" [2mm] drill bit and install a small hole control horn with two 2 x 15mm [5/8"] machine screws and a control horn back plate.



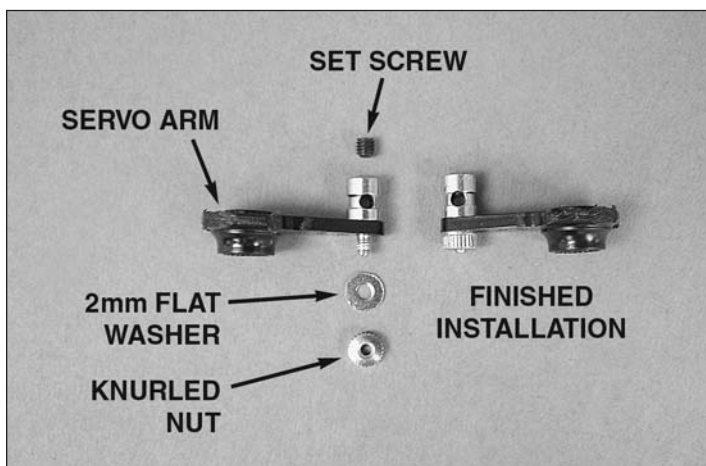
❑ 3. Using a pair of diagonal pliers, remove the ends of the machine screw that protrude through the control horn backplate.



❑ 4. With the other 19-3/4" [502mm] long pushrod, install a small hole control horn on the right side of the rudder in the same manner.



□ 5. Using the hardware supplied with the servos, install the elevator and rudder servo into the servo tray with the servo spines facing forward, in the locations shown. Be sure to reinforce the servo mounting screw holes with thin CA. as was done on the aileron servo mounting holes.

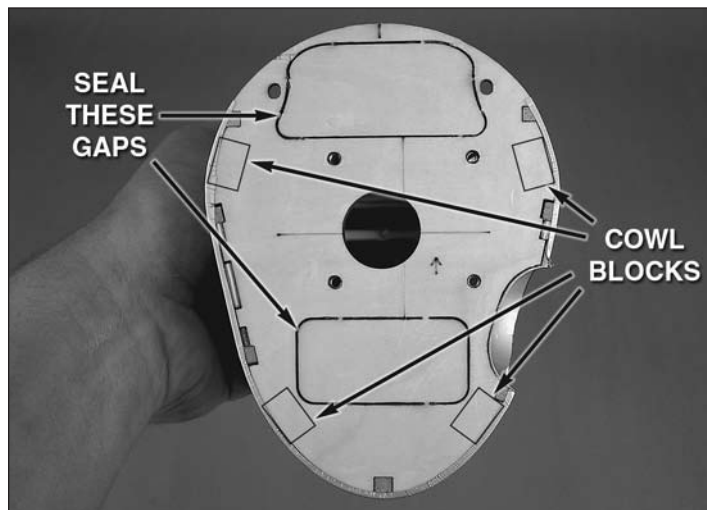


□ 6. As you did with the ailerons, cut three arms from the elevator and rudder servo arms. Enlarge the outer hole of each servo arm with a 5/64" [2mm] drill bit. Install a screw-lock pushrod connector into the outer hole of each servo arm. Tighten them to the servo arms with a 2mm flat washer, knurled nut, and thread locking compound. The nut should be snug against the washer but still allow the pushrod connector to rotate freely in the servo arm hole. Slide the pushrod wires through the screw-lock pushrod connectors

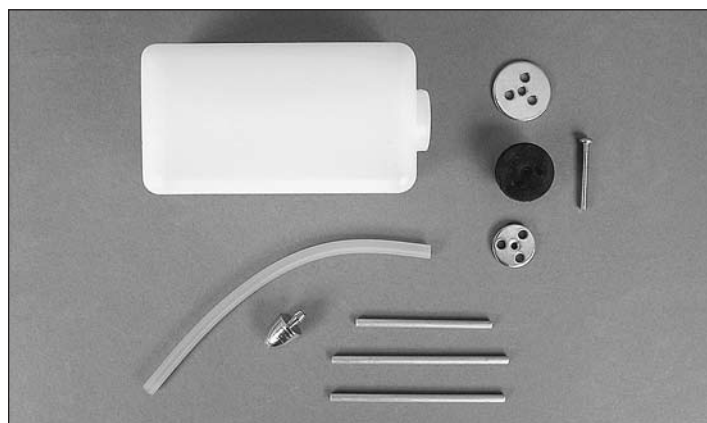
and attach the servo arms to the servos using the servo arm screws included with the servos. With the elevators and rudder centered, thread a 3mm set screw into the tops of the pushrod connectors and tighten it against the pushrod wires. Cut away the excess pushrod wires beyond the pushrod connectors.

## Glow Engine and Fuel Tank Installation

*The Combat P-47 ARF is designed to be flown with a .25 glow engine or a brushless out-runner motor. If you plan to install a brushless motor, skip this section as it only contains information relevant to installing a glow engine.*

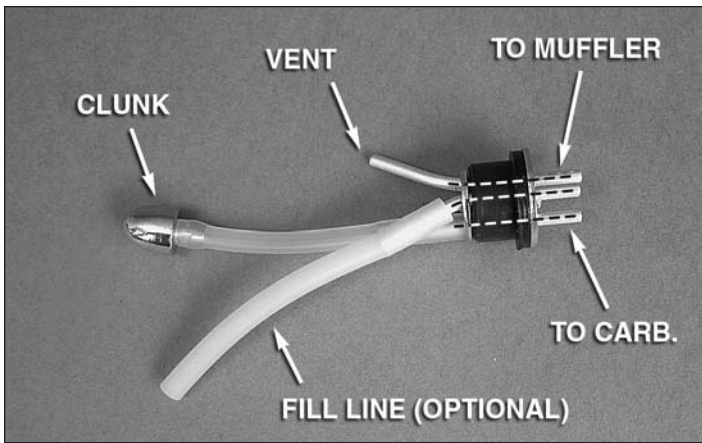


□ 1. Seal the cooling air cutouts using some medium CA. Using thick CA or 6 minute epoxy, mount the 3/8"x 3/8"x 9/16" [9.5x9.5x14.3mm] cowl mounting blocks to the firewall, in the location shown.

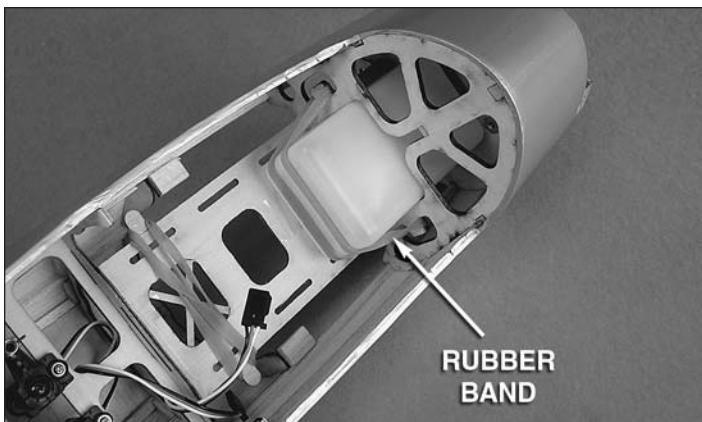
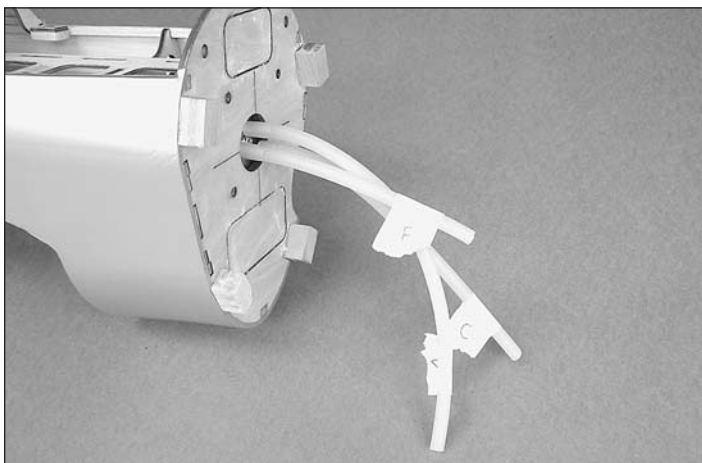


□ 2. Remove the stopper from the fuel tank and remove the contents.

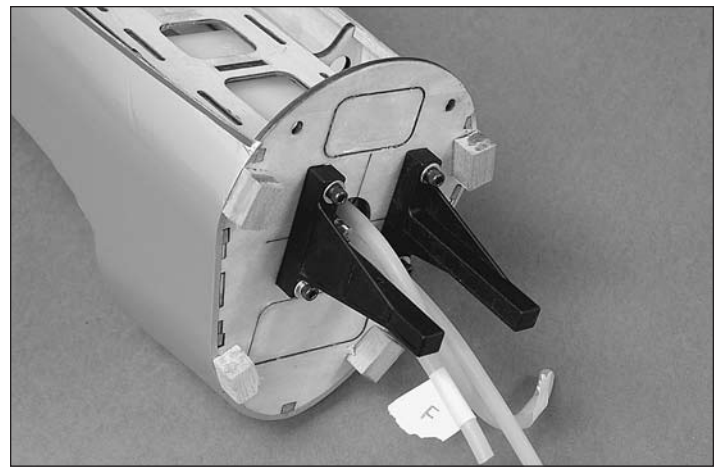
□ 3. The fuel tank can be assembled as a two line system consisting of a vent (pressure) line to the muffler and a carb line. Filling and emptying of the tank would need to be done through the carb line, or an optional fuel fill valve (not included). The tank can also be assembled as a three line system having a vent line, carb line, and fill line. If installing a fill line, clear the plugged opening in the fuel tank stopper.



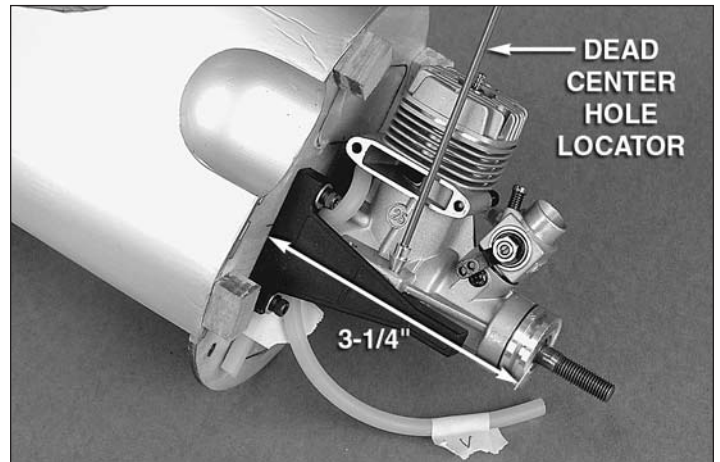
❑ 4. Fit the stopper assembly into the tank with the vent line pointing toward the top of the tank, but not touching. The fuel tubing and clunk (fuel pickup) on the carb line should almost reach the back of the tank but not touch. The clunk must be able to move freely inside the tank when assembled. Adjust the length of the fuel tubing accordingly. If you wish to use the fill line to drain the tank, bend the metal tube toward the bottom of the tank and attach a length of fuel tubing to it, as shown. When satisfied, tighten the 3x25mm [1"] screw in the stopper to secure it in place (do not over-tighten).



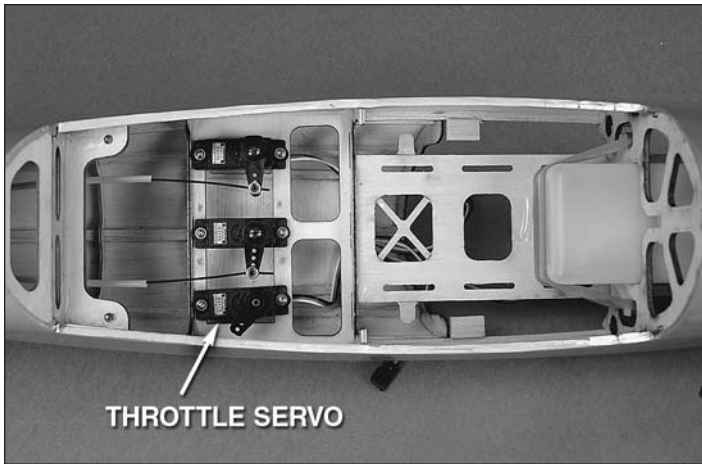
❑ 5. Insert the tank into the fuselage with the correct side facing up. The neck of the tank should pass through the hole in the firewall. Attach a 6" [152mm] piece of fuel line to the metal tubes. It is a good idea to mark each of the lines using some tape and a marker. Finish the tank installation by securing the tank to the firewall using a rubber band as shown.



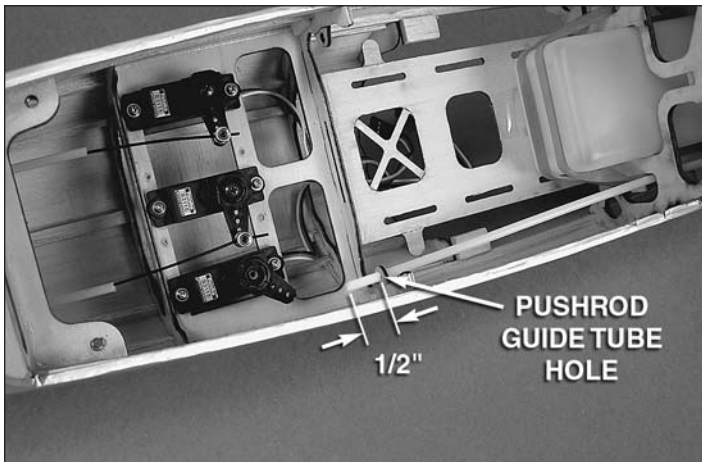
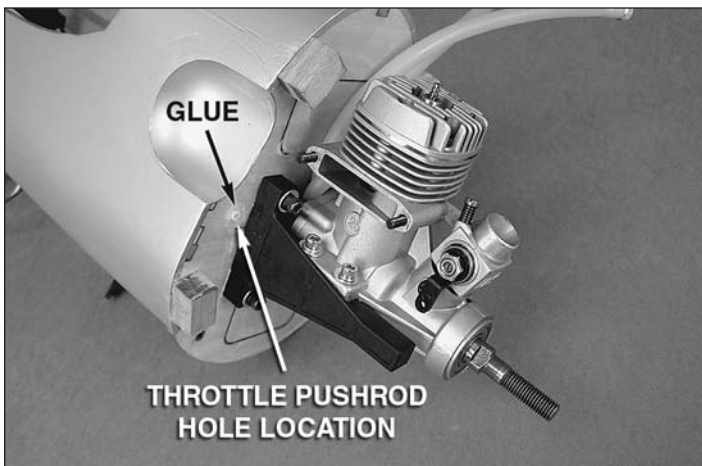
❑ 6. Using four 3 x 22mm [7/8"] SHCS, four 3mm flat washers, and four 3mm lock washers, attach the engine mount inverted to the firewall. Be sure to use some thread locker on the SHCS threads.



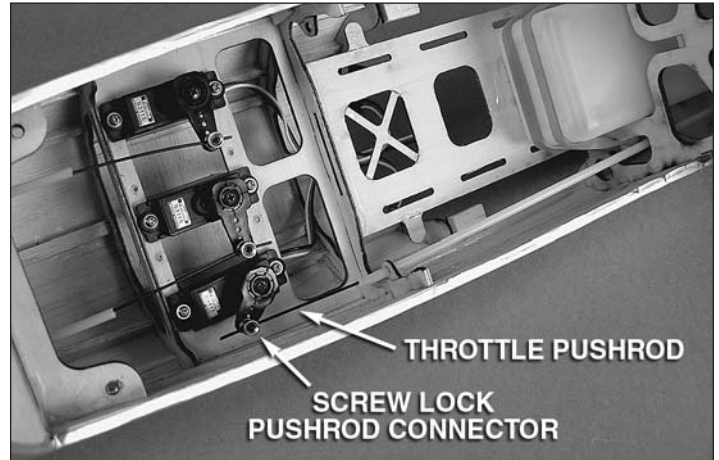
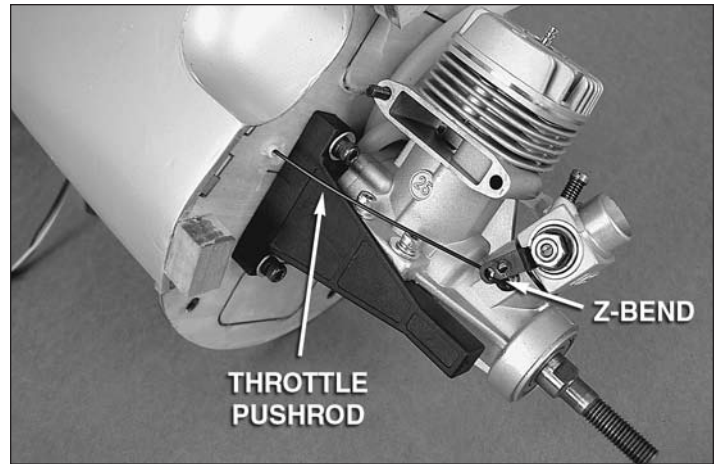
❑ 7. Position the front of the engine drive washer 3-1/4" [83mm] from the firewall. Mark the location of the engine mount holes onto the mount rails using a Dead Center Hole Locator. Remove the engine from the mount and use a 3mm tap and drill set to create threads in the four mounting holes. Attach the engine to the mount using four 3x20mm [13/16"] SHCS, four 3mm flat washers, and four 3mm lock washers.



❑ 8. Install the throttle servo into the servo bay, using the same method used for the rudder and elevator servos.



❑ 9. Drill a 1/8" [3.2mm] hole through the firewall inline with the throttle arm on the engine. **Important! – Do not drill into the fuel tank!** If in doubt, remove the tank before drilling your hole. Insert the 1/8" x 9-5/8" [3 x 245mm] outer pushrod tube through the hole in the firewall. There is a pushrod guide tube hole located just in front of the servo tray. Run the pushrod guide tube through both holes and glue the tube to the holes using CA glue. Be sure not to get any CA glue on the inside of the tube. Trim the pushrod guide tube so that it extends 1/2" [12.7mm] past the hole in front of the servo tray, and is flush with the firewall.

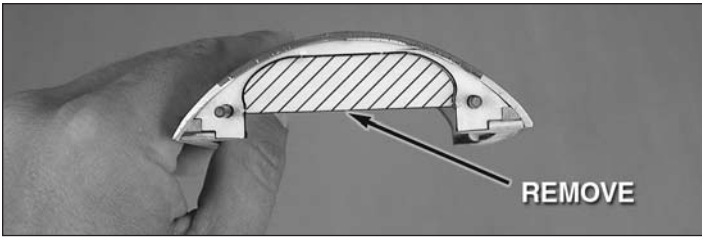
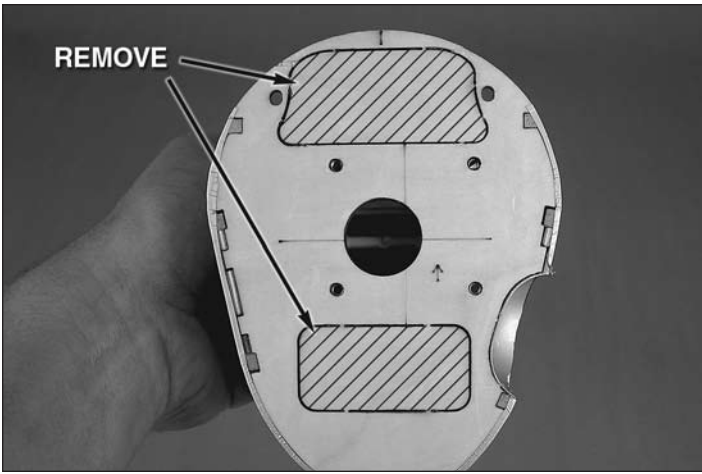


❑ 10. Install the .039" x 13-3/4" [1 x 350mm] throttle pushrod with Z-bend into the outer pushrod and connect the Z-bend to your engine throttle arm (you may need to remove the arm from the carburetor to do this). Install a screw-lock pushrod connector into the second from the outer hole of the throttle servo arm, as was done for the elevator and rudder servo. Test the servo arm onto the servo. You may need to trim the end of the servo arm to allow it to clear the side of the fuselage. Tighten the aft end of the throttle pushrod in the screw-lock connector (do not cut off the excess length of pushrod until you have used your radio system to center the servo and have made your adjustments to the pushrod length).

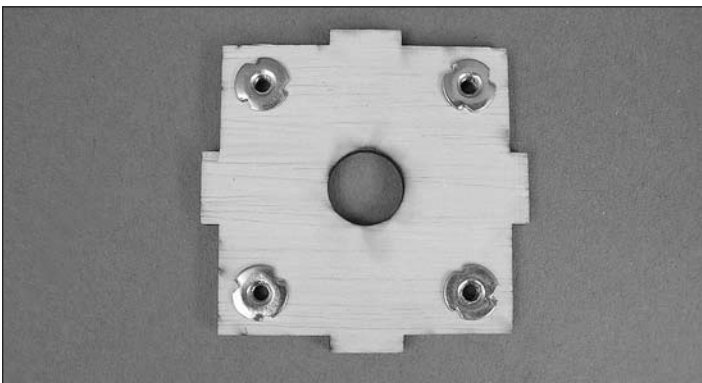
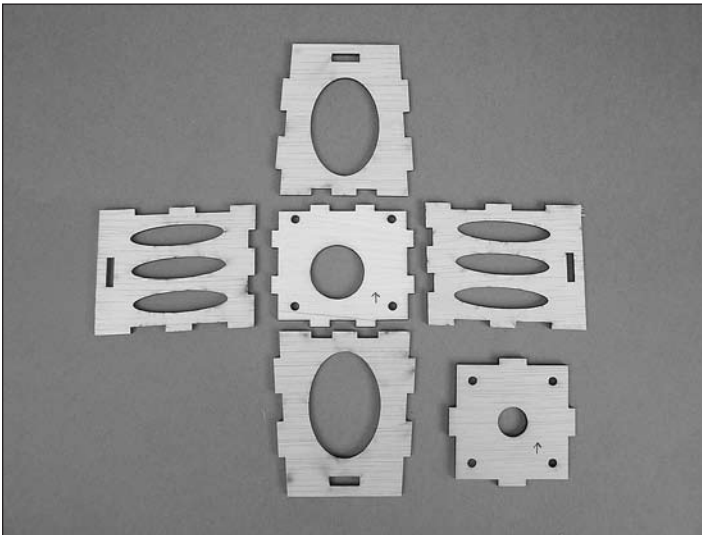
❑ 11. Trim the fuel tubing to length and connect the vent line to the muffler and the carb line to the fuel inlet on the needle valve. A nylon plug has been provided for the fill line, if you installed one.

## Out-runner Motor and Battery Installation

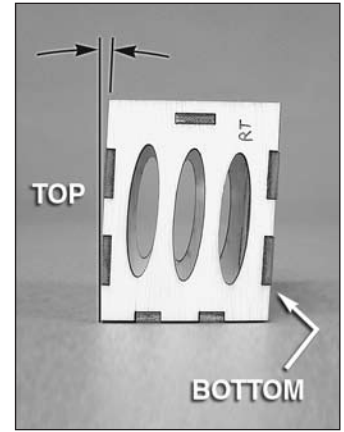
*The Combat P-47 ARF is designed to be flown with a .25 glow engine or a brushless out-runner motor. If you have installed a glow engine, skip this section as it only contains information relevant to installing a brushless motor.*



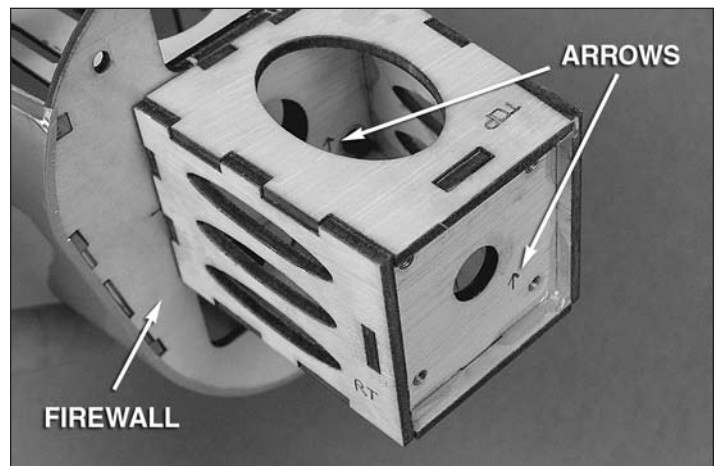
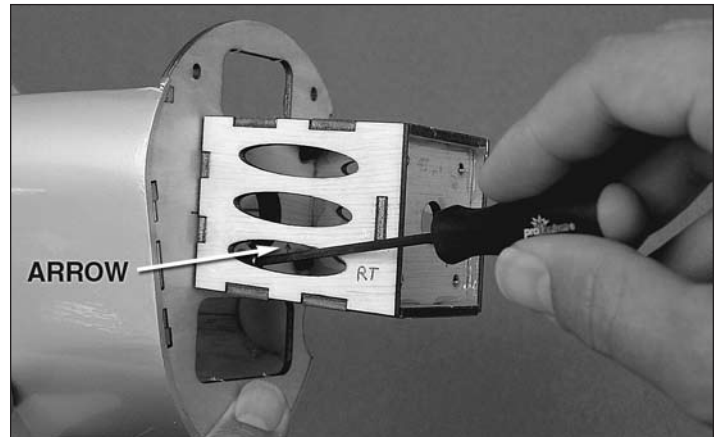
❑ 1. Cut the perforations along the cooling hole and remove the cutout on the firewall and hatch.



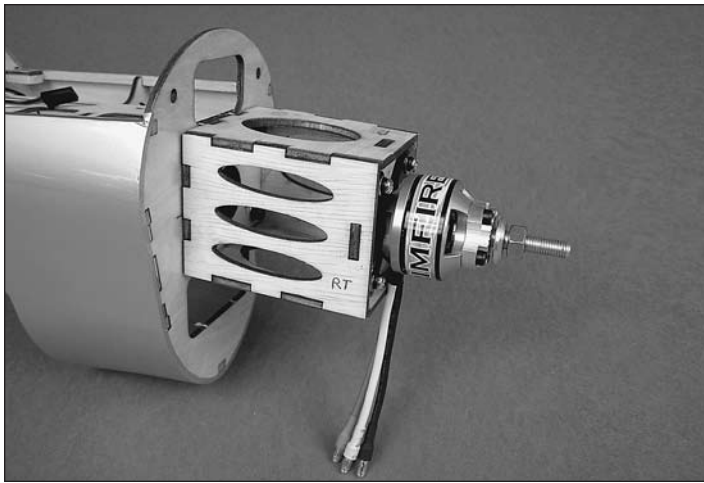
❑ 2. Locate the three **brushless motor mount adapter pieces**. Install the 3mm blind nuts onto the back side of the motor mount. Use a 3 x 10mm [3/8"] screw and a 3mm flat washer to draw them tight into the holes.



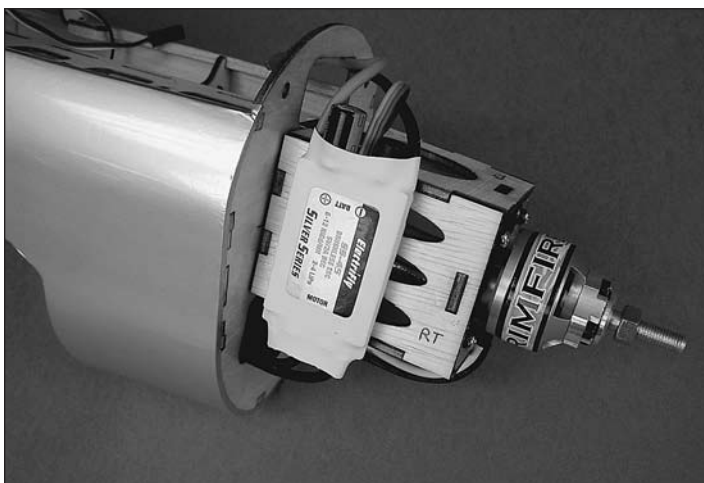
❑ 3. Test fit the motor mount pieces together. Be certain that the arrow on the firewall and motor mounting plate piece appears in the lower right corner when viewed from the front. When the motor mount is assembled correctly and placed flat it should lean slightly toward the bottom piece. Epoxy the pieces together, being very careful to align the edges flush with each other. Excess epoxy can be wiped up with denatured alcohol.



❑ 4. This mount has been designed so that it is removable. Attach the motor mount adapter to the firewall using four 3 x 22mm [7/8"] SHCS, four 3mm flat washers, and four 3mm lock washers. You may access the SHCS from the elongated holes in the motor mount located on the side. Be certain that the arrow on the pieces appears in the lower right corner, when looking at the front of the model.



❑ 5. Mount the motor to the motor mount using four 3 x 15 mm [5/8"] machine screws, 3mm flat washers, and four 3mm lock washers. Be sure to use thread locker on the machine screw threads.



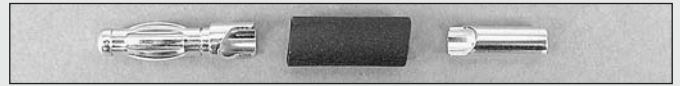
❑ 6. Connect the motor to the ESC using 4mm Male to 3.5mm Female Bullet Connector Adapters (GPMM3123). Using some double sided foam tape, mount the ESC to the side of the motor mount, as shown. Attach a 6" [152mm] long servo extension to the ESC, and secure it using some 3/8" [9.5mm] heat shrink tubing or electrical tape.



## EXPERT TIP

### MAKE BATTERY CONNECTOR ADAPTERS

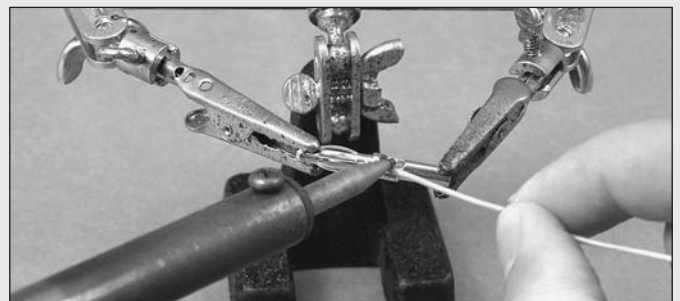
If the Great Planes 4mm male to 3.5mm female bullet connector adapters are not available, or you would like to make your own, the assembly procedure and order numbers for the individual parts are provided below.



❑ A. In order to make three adapters for one complete brushless motor system, you will need two Great Planes Gold Plated Bullet Connectors Female 3.5mm (GPMM3113), Great Planes Gold Plated Bullet Connectors Male 4mm (GPMM3114), electrical solder with flux, and a soldering iron.



❑ B. Insert the 3.5mm female bullet connector (the end with the cutout on the side) into the open end of the 4mm male bullet connector. Shown in the photo above is the X-Acto® Extra Hands Double Clip (XACR4214). This tool is extremely useful for small soldering tasks.

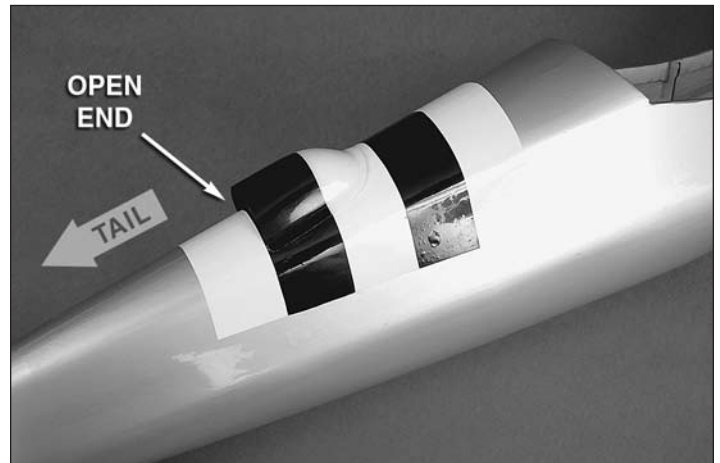
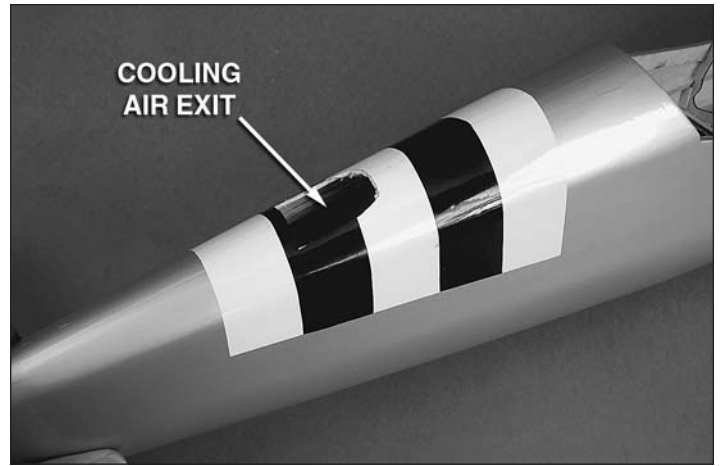


❑ C. With the female bullet in the open end of the male bullet and the cutouts in both connectors lined up, apply solder with flux into the cutouts. When applying the solder, it should appear to flow into the joint and around the ends of the connectors until the joint is coated. Excess solder is not necessary as it will simply gather at the bottom of the joint. Use alcohol to wipe the joint clean.

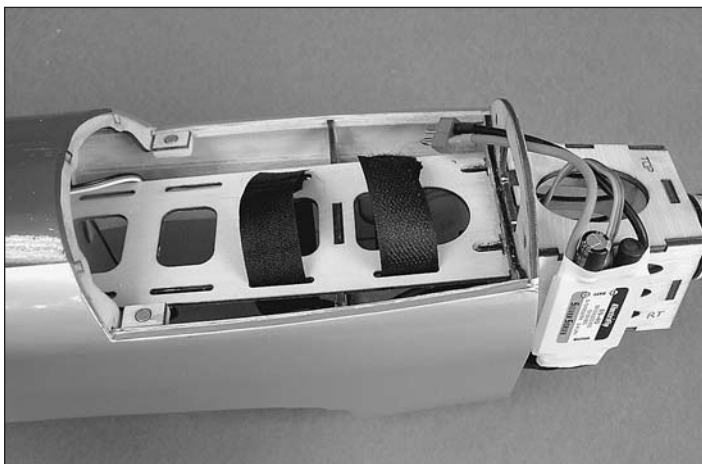
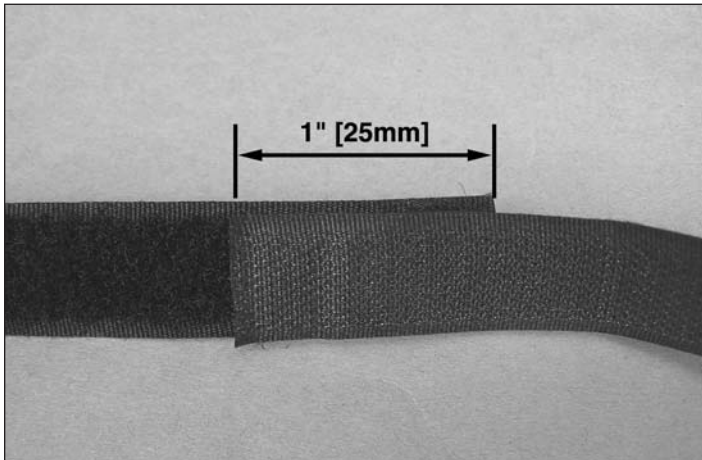




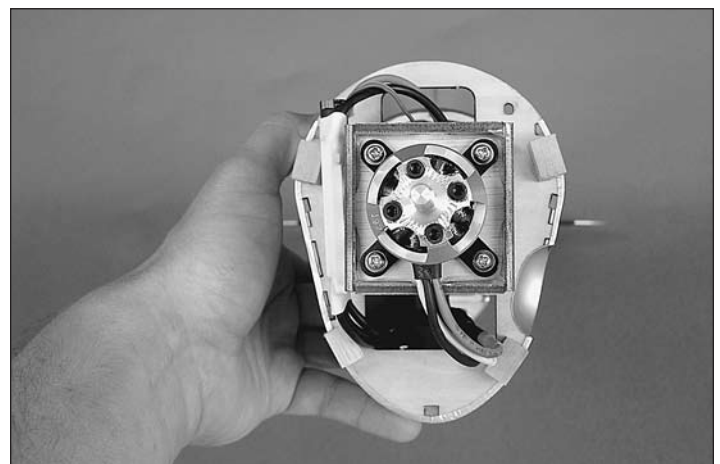
□ D. When satisfied, slide a piece of heat-shrink tubing over the adapter up to the base of the male bullet connector. Use a heat gun or micro torch to shrink the tubing onto the adapter. If necessary, trim the excess heat-shrink tubing from the end of the female bullet connector.



□ 8. Remove the covering from the cooling air exit hole located on the underside of the fuselage, approximately half way between the wing and tail. Roughen the underside of the rear scoop. Install the rear scoop over the cooling air exit using thick CA glue so that the scoop opens toward the tail.



□ 7. Cut the provided hook and loop material in half. Make two hook and loop straps 7-1/2" [190mm] long by overlapping the ends approximately 1" [25.4mm]. Place the straps through the battery tray in the location shown. Glue the strap to the underside of the **battery tray** with medium or thick CA. These straps will be used to secure the battery during flight.

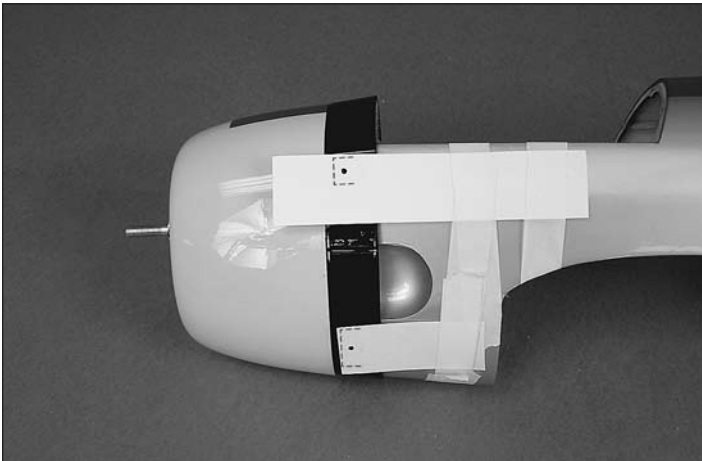
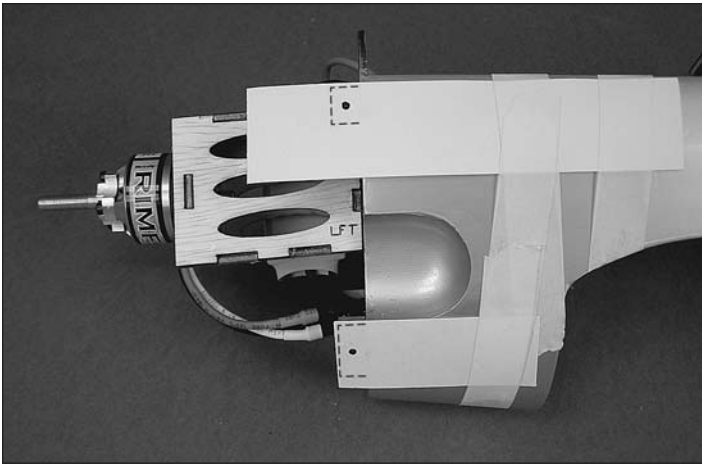


□ 9. Locate the four 3/8"x3/8"x9/16" [9.5x9.5x14.3mm] cowl mounting blocks. Using thick CA glue or 6-minute epoxy, mount the blocks to the firewall in the locations shown.

## FINISH THE MODEL

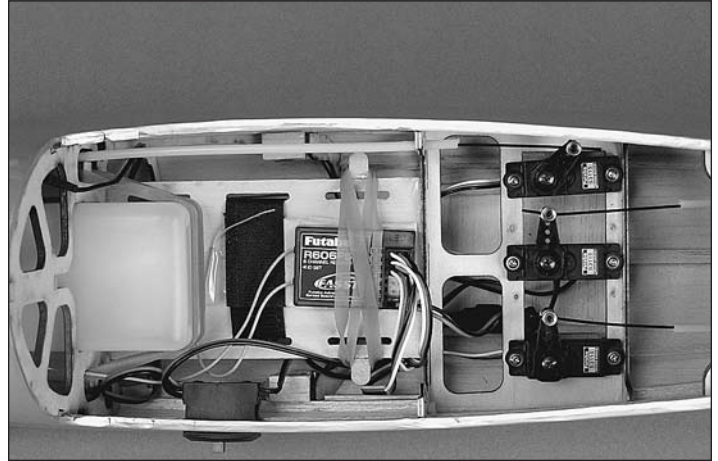
### Install the Cowl

The cowl installation is shown on the brushless motor power system. Installing the cowl over a glow engine is the same. However, you will need to make a hole for glow plug access, a hole to access the needle valve, and a cutout for the muffler.

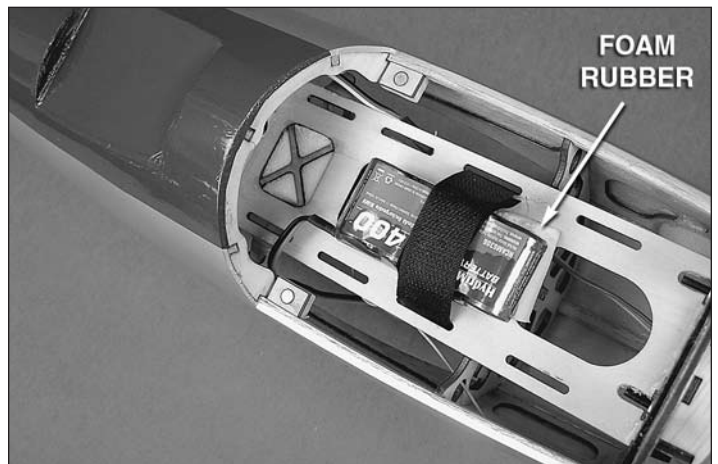


❑ 1. Tape some pieces of cardboard to the fuselage to mark the location of the cowl mounting blocks. Place the cowl over the fuselage and center it. Drill a 1/16" [1.6mm] pilot hole through the cowl and into each of the blocks. Attach the cowl to the fuselage using the 3/8" [9.5mm] self-tapping wood screws. Remove the cowl and harden the cowl mounting holes you have just tapped with some thin CA.

### Install the Radio Gear



❑ 1. Cut a piece of 1/4" [6.4mm] or 1/2" [12.7mm] thick foam rubber (not included) to fit your receiver. Attach the receiver to the underside of the battery tray using a rubber band (not included) and connect the servos to the receiver, as shown.



❑ 2. If using a glow engine, create a hook and loop strap by cutting the provided hook and loop material in half, overlapping the hook and loop material 1" [25.4mm] and threading it through the openings in the battery tray. Place a piece of foam rubber under the battery and strap the battery to the top of the battery tray, as shown.

❑ 3. Route the receiver antenna down the outside of the fuselage or, if using a 2.4GHz receiver, simply tape it to the fuselage and the battery tray

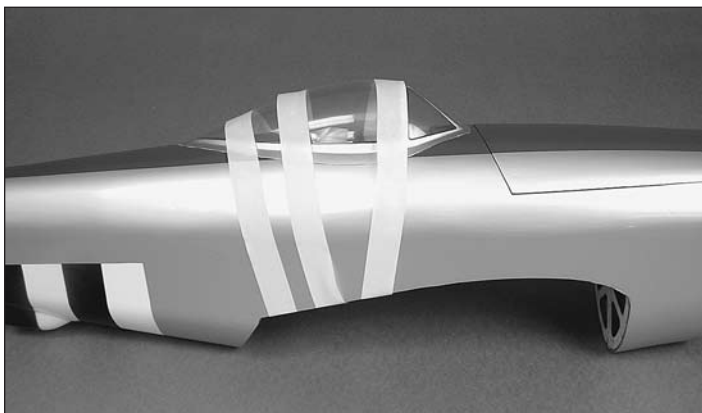
❑ 4. If you have not done so already, connect the elevator and rudder servos to the receiver. If you are using a transmitter that does not support mixing, you will also need a dual servo extension or Y-harness to join the aileron servos together. If you have installed a glow engine, an optional switch can be installed onto the side of the fuselage wherever there is free space. Be sure that it does not interfere with any of the pushrods. There is no need to use a charge jack with this model, because of the easily removed hatch.



❑ 5. If you have installed a brushless motor, apply the hook side of the included self-adhesive hook and loop material to the battery tray (cut to length as needed).



❑ 6. Install the loop side of the included self-adhesive hook and loop material onto the battery pack. Some packs may be able to be moved forward or aft to minimize additional weight added to the plane for balancing purposes. The P-47 has been designed so that the battery pack may slide through the firewall and onto the motor box for proper balancing.

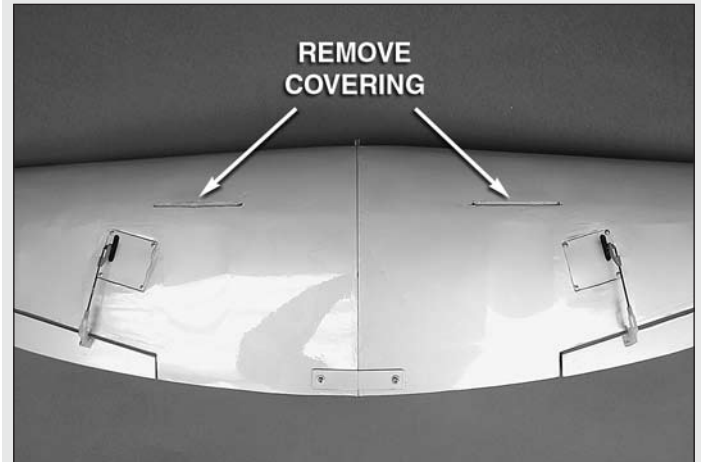


❑ 7. Attach the canopy to the fuselage with canopy glue. Use masking tape to hold the canopy in place while the glue dries.

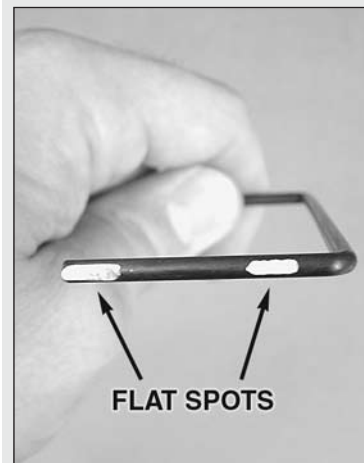
❑ 8. Install your propeller to the motor shaft. Prepare the model for balancing by installing the wing using two 3mm flat washers and two 3 x 25 mm [1"] machine screws.

## Optional Landing Gear

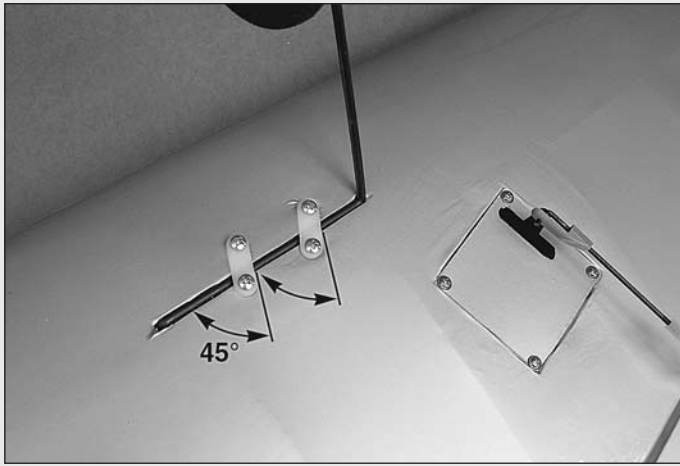
The P-47 includes optional landing gear for those modelers who choose to sport fly the model and would benefit from using landing gear. The included landing gear is recommended for paved runways only. If you plan to fly the P-47 in combat competition, we suggest omitting the gear for reduced weight and increased maneuverability.



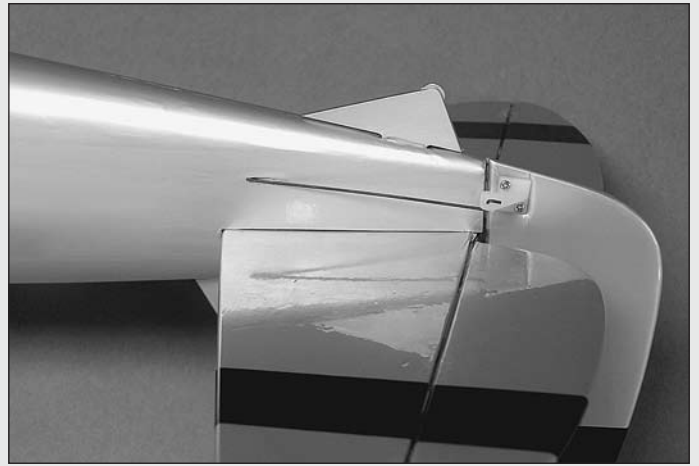
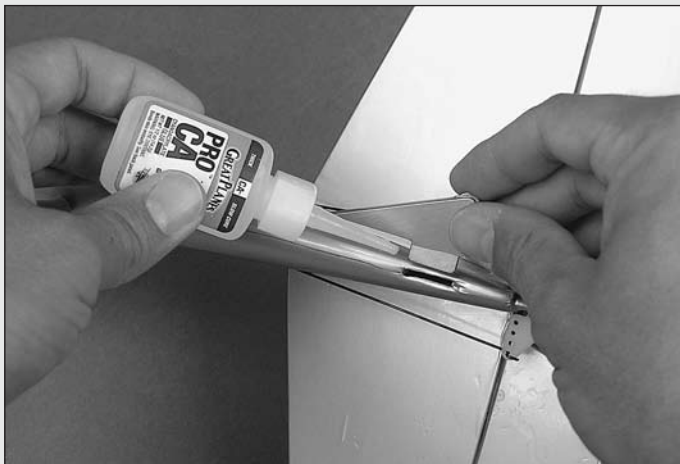
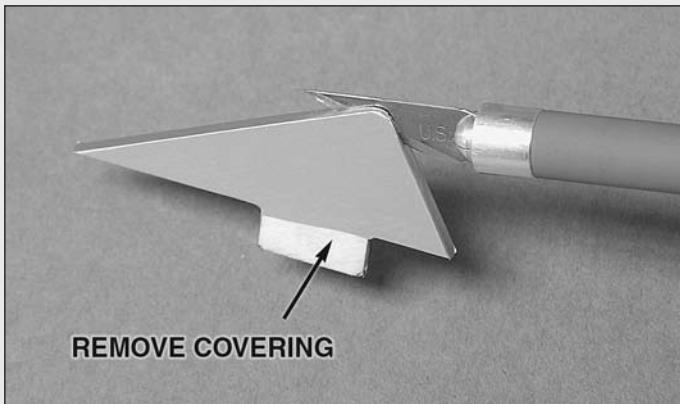
❑ 1. Trim the covering from the landing gear slots on the underside of the wing.



❑ 2. Using four 3mm wheel collars and four 3mm set screws, temporarily install the wheels onto the landing gear centering them on the axles. Tighten the set screws against the axles. Remove the wheels and wheel collars and grind flat spots on the axles where set screws made marks from being tightened. A rotary tool such as a Dremel with a cutoff wheel or a metal file can be used to make the flat spots.

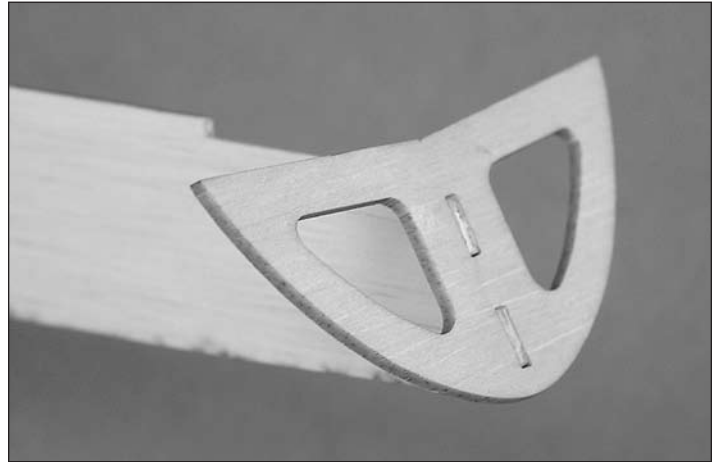


❑ 3. Reinstall the wheels onto the axles using the wheel collars, set screws, and thread locking compound. Be sure that the wheels rotate freely. Oil the wheels at the axles if necessary. Fit the gear into the slots in the wing. Position four landing gear straps over the wire as shown. Mark the locations for the strap holes onto the wing and drill 5/64" [2mm] holes at the marks (**DO NOT** drill completely through the wing!). Thread a 2.5 x 10mm self-tapping screw into each hole and remove it. Apply a couple drops of thin CA glue to each hole to harden the wood. Install the straps over the landing gear using eight 2.5 x 10mm self-tapping screws.



❑ 4. Trim the covering from the long edge of the **tail skid**. Use a hobby knife to make a slit in the tail skid and glue a washer into the slot. Trim the covering from the slot in the fuselage where the tail skid will be glued.

### *Installing the Belly Pan and the Machine Guns*



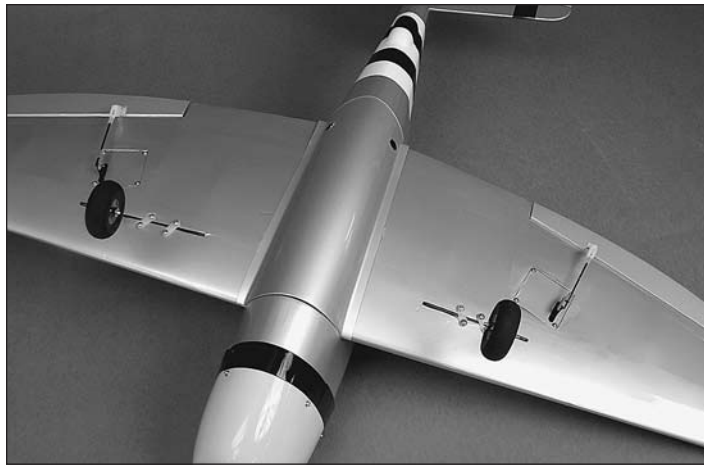
❑ 1. Locate the two belly pan support pieces and glue them together. Then glue the pieces to the belly pan as shown.

## GET THE MODEL READY TO FLY

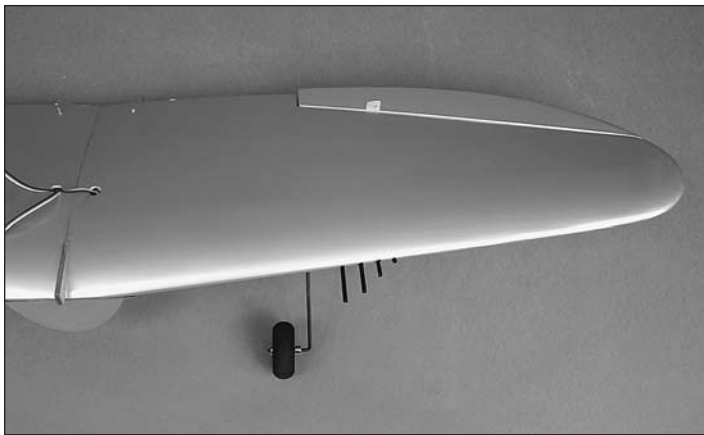
### Check the Control Directions

❑ 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.



❑ 2. Glue the belly pan to the wing using some thick CA glue, in the location shown.



❑ 3. Locate the gun mounting holes in the leading edge of each side of the wing. Install the guns using some CA glue, as shown. **Note:** The longest gun goes in the inboard hole. The shortest gun goes in the outboard hole.

### Apply the decals

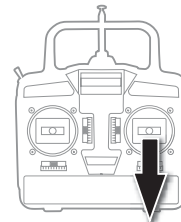
1. Use scissors or a sharp hobby knife to cut the decals from the sheet.

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. Submerge 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.

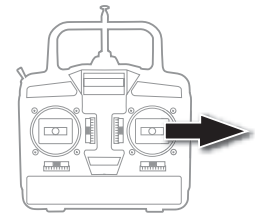
3. Position the decal on the model where desired. Holding the decal down, use a paper towel to wipe most of the water away.

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.

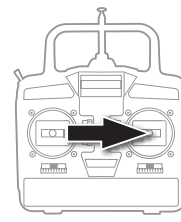
#### 4-CHANNEL RADIO SETUP (STANDARD MODE 2)



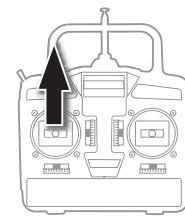
ELEVATOR MOVES UP



RIGHT AILERON MOVES UP  
LEFT AILERON MOVES DOWN



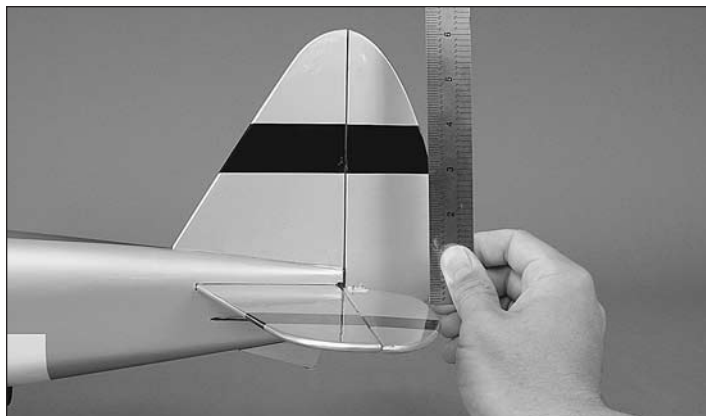
RUDDER MOVES RIGHT



FULL THROTTLE

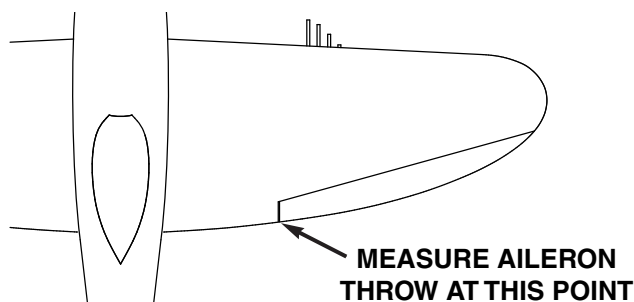
❑ 3. Make certain that the control surfaces and the carburetor respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces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

## Set the Control Throws



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

**NOTE:** The throws are measured at the **widest part** of the elevators and rudders. Aileron throws are to be measured from the inboard portion of the aileron.



### These are the recommended control surface throws:

	HIGH RATE		LOW RATE	
	Up	Down	Up	Down
<b>ELEVATOR</b>	3/8"	3/8"	15/64"	15/64"
	[9.5mm] 10deg	[9.5mm] 10deg	[6mm] 7deg	[6mm] 7deg
<b>RUDDER</b>	Right	Left	Right	Left
	1"	1"	11/16"	11/16"
	[25.4mm] 28deg	[25.4mm] 28deg	[17.5mm] 17deg	[17.5mm] 17deg
<b>AILERONS</b>	Up	Down	Up	Down
	13/64"	13/64"	1/8"	1/8"
	[5.2mm] 9deg	[5.2mm] 9deg	[3.2mm] 5deg	[3.2mm] 5deg

**IMPORTANT:** The Combat P-47 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 P-47 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 engine or brushless motor, landing gear, and the radio system (and battery pack if applicable).

1. Use a felt-tip pen or 1/8" [3mm]-wide tape to accurately mark the C.G. on the top of the wing on both sides of the fuselage. The recommended C.G. is located 2-1/4" [57mm] back from the leading edge of the wing.

This is where your model should balance for the first flights. Later, you may wish to experiment by shifting the C.G. up to 3/16" [5.2mm] forward or 1/2" [12.7mm] 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 upside-down on a Great Planes CG Machine, or lift it upside-down at the balance point you marked.

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

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

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

### ***Balance the Model Laterally***

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

❑ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by

adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

## ***PREFLIGHT***

### ***Identify Your Model***

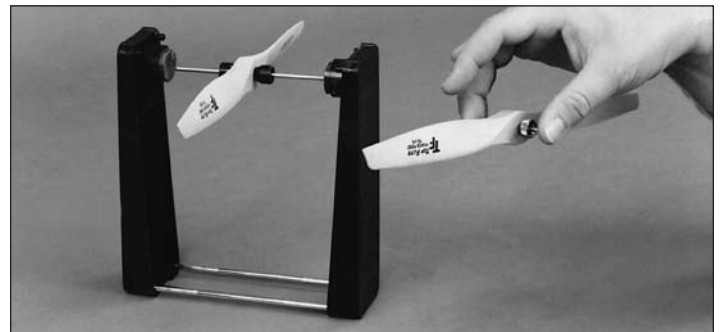
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 27 (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 engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or quit.

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

## **Ground Check**

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

## **Range Check**

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

## **ENGINE SAFETY PRECAUTIONS**

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

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

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

Use safety glasses when starting or running engines.

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

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

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

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

Make all engine adjustments from behind the rotating propeller.

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

To stop a glow engine, cut off the fuel supply by closing off the fuel line or following the engine manufacturer's recommendations. Do not use hands, fingers or any other body part to try to stop the engine. To stop a gasoline powered engine an on/off switch should be connected to the engine coil. Do not throw anything into the propeller of a running engine.

## **LITHIUM BATTERY HANDLING & 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. Balance your model *laterally* as explained in the instructions.
- 5. Use threadlocking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.
- 6. Add a drop of oil to the axles so the wheels will turn freely.
- 7. Make sure all hinges are **securely** glued in place.
- 8. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl mounting screws, etc.).
- 9. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- 10. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.
- 11. Secure connections between servo wires and Y-connectors or servo extensions, and the connection between your battery pack and the on/off switch with vinyl tape, heat shrink tubing or special clips suitable for that purpose.
- 12. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- 13. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.

- 14. Make sure the fuel lines are connected and are not kinked.
- 15. Balance your propeller (and spare propellers).
- 16. Tighten the propeller nut and spinner.
- 17. Place your name, address, AMA number and telephone number on or inside your model.
- 18. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
- 19. If you wish to photograph your model, do so before your first flight.
- 20. Range check your radio when you get to the flying field.

## FLYING

The Combat P-47 ARF is a great-flying model that flies smoothly and predictably. The P-47 does not, however, possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

### Fuel Mixture Adjustments

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

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

### Takeoff

Before you get ready to takeoff, see how the model handles on the ground by doing a few practice runs at **low speeds** on the runway. Hold “up” elevator to keep the tail skid on the ground. If you need to calm your nerves before the maiden flight, shut the engine down and bring the model back into the pits. Top off the fuel, then check all fasteners and control linkages for peace of mind.

Remember to takeoff into the wind. When you’re ready, point the model straight down the runway, hold a bit of up elevator to keep the tail on the ground, then gradually advance the throttle. As the model gains speed decrease up elevator allowing the tail to come off the ground. One of the most important things to remember with a tail dragger is to always be ready to apply **right** rudder to counteract engine torque. Gain as much speed as your runway and flying site will practically allow before gently applying up elevator, lifting the model into the air. At this moment it is likely that you will need to apply more right rudder to counteract engine torque. Be smooth on the elevator stick, allowing the model to establish a **gentle** climb to a safe altitude before turning into the traffic pattern.

### Flight

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

Take it easy with the Combat P-47 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 fuel, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how she climbs as well. Continue to fly around, executing various maneuvers and making mental notes (or having your assistant write them down) of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your flight time, but use this first flight to become familiar with your model before landing.

### Landing

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

model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and climb out to make another attempt. When you're ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, hold up elevator to place the tail on the ground.

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:

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Name

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Address

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City, State, Zip

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Phone number

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AMA number

