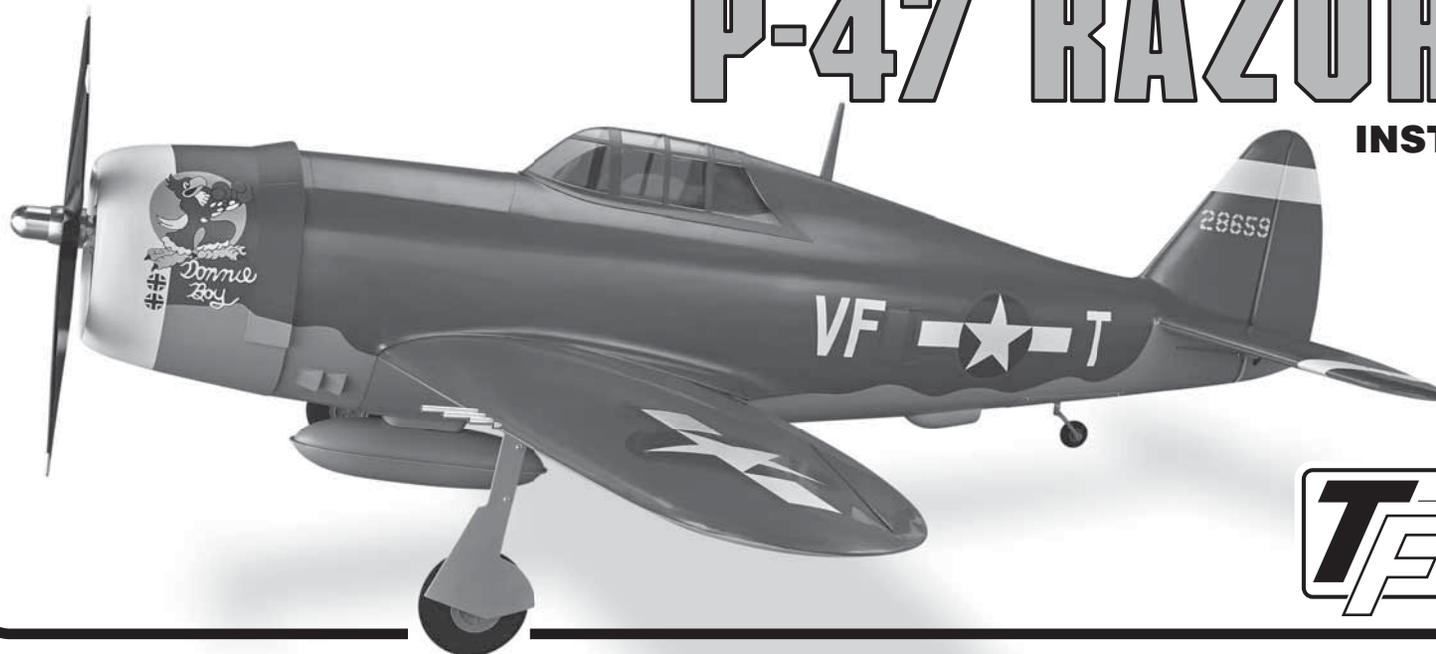


P-47 RAZORBACK

INSTRUCTION MANUAL



Top Flite Models Champaign, IL
Telephone (217) 398-8970, Ext. 5
airsupport@top-flite.com



WARRANTY

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

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

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

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

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.

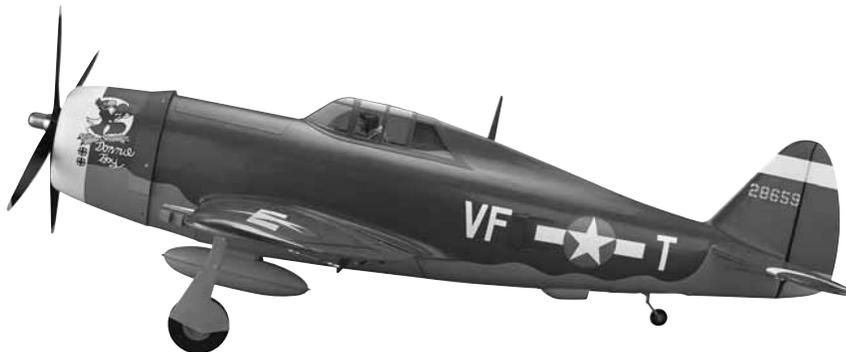
SPECIFICATIONS

Wingspan:	85 in [2160 mm]
Wing Area:	1329 sq in [85.7 dm ²]
Weight:	19.5 – 21.5 lb [8842 – 9749 g]
Wing Loading:	34 – 37 oz/sq ft [104 – 113 g/dm ²]
Length:	75 in [1905 mm]
Radio:	5-8 channel
Engine:	2.6 – 4.0 cu in [43 – 65 cc] spark ignition gas
Elec. Motor:	RimFire 65 cc 80-85-160kV
Flight Battery:	12S 5000 mAh

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

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INTRODUCTION

The P-47 Razorback has been recognized as an excellent modeling subject. The large wing and tail area and long tail moment make an ideal flying airplane – especially for a warbird! The Top Flite Giant P-47 (with Razorback option) kit is a very successful model. Now, Top Flite has developed the Giant P-47 Razorback ARF following the same design as the kit. The Giant P-47 Razorback ARF will get you in the air quickly with a great looking model, without the sanding and covering required to build a kit.

For the latest technical updates or manual corrections to the Giant P-47 Razorback ARF visit the Top Flite web site at www.top-flite.com. Open the “Airplanes” link, then select the Giant P-47 Razorback 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

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

Academy of Model Aeronautics

5151 East Memorial Drive
Muncie, IN 47302-9252

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



Or via the Internet at:
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.

SCALE COMPETITION

Though the Top Flite Giant P-47 Razorback is an ARF and may not have the same level of detail as an “all-out” scratch-built competition model, it is a scale model nonetheless and is therefore eligible to compete in

the *Fun Scale* class in AMA competition (we receive many favorable reports of Top Flite ARFs in scale competition!). In Fun Scale, the “builder of the model” rule does not apply. To receive the five points for scale documentation, the only proof required that a full size aircraft of this type in this paint/markings scheme did exist is a single sheet such as a kit box cover from a plastic model, a photo, or a profile painting, etc. If the photo is in black and white, other written documentation of color must be provided. Contact the AMA for a rule book with full details.

SAFETY PRECAUTIONS

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

1. Your Giant P-47 Razorback 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 Giant P-47 Razorback ARF, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.
2. You must assemble the model **according to the instructions**. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
3. You must take time to **build straight, true and strong**.

4. You must use an R/C radio system that is in good condition, a correctly sized engine, and other components as specified in this instruction manual. All components must be correctly installed so that the model operates correctly on the ground and in the air. You must check the operation of the model and all components before **every** flight.

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

6. While this 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.

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

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

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

DECISIONS YOU MUST MAKE

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

ENGINE RECOMMENDATIONS

When considering engines for this model, refer to the engine size recommendations on the cover of the manual. Spark-ignition “gas” engines are most popular with large-scale warbirds such as this. One advantage of a gas engine is economy – gas engines tend to consume less fuel than a glow engine as well. Additionally, gas engines deposit little exhaust residue on the model. Among other engines, this model was test flown with a **DLE 61** engine. The DLE 61 provides more than adequate power and flies the Giant P-47 Razorback ARF in a scale-like manner.

NOTE: Instructions for mounting every possible engine cannot be incorporated into this manual. Modelers using another engine may refer to the instructions as a guide for mounting their engine in a similar way.

ELECTRIC MOTOR RECOMMENDATIONS

- Great Planes RimFire 65cc (80-85-160) Outrunner Brushless Motor (GPMG4805)
- Castle Creations Phoenix Edge 160HV 50V 160 amp ESC (CSEM0300)
- Two FlightPower LiPo FP50 5000mAh 22.2V batteries (FPWP5506)
- Great Planes Standoff Brushless Motor Mount XX Large (GPMG1275)

RADIO EQUIPMENT

The radio equipment and number of channels required to fly the Top Flite Giant P-47 Razorback ARF depends on the capabilities of your transmitter and how the servos will be connected.

The Giant P-47 Razorback ARF requires a servo to operate the air control valve if using pneumatic retracts, a throttle servo, two flap servos, two aileron servos, two elevator servos and a rudder servo. Servos with a minimum of 50 oz-in [3.9kg-cm] of torque are required for operating the elevators, rudder, ailerons and flaps. We recommend that metal geared servos also be used. Standard servos may be used for the throttle and choke (the servo operated choke is optional). A micro servo is required to operate the retract air valve. An optional servo operated kill switch may also be used (this is in addition to the manually operated engine kill switch). A servo operated kill switch is only really necessary for engines that do not reliably shut off by closing the carburetor, but could also serve as a backup.

Function	Qty.	Type Required
Elevators	2	Futaba S3305 (FUTM0045) min. 50 oz-in torque
Rudder	1	Futaba S3305 (FUTM0045) min. 50 oz-in torque
Ailerons	2	Futaba S3305 (FUTM0045) min. 50 oz-in torque
Flaps	2	Futaba S3305 (FUTM0045) min. 50 oz-in torque
Tail Wheel Steering	1	Futaba S3305 (FUTM0045) min. 50 oz-in torque
Throttle	1	Futaba S3004 (FUTM0027) standard
Retract	1	Futaba S3102 (FUTM0034) micro
Optional Choke	1	Futaba S3004 (FUTM0027) standard
10-11		Total

A receiver battery with a minimum of 1,000mAh is recommended for flying the Giant P-47 Razorback ARF. The battery voltage should be checked before every flight to be certain it has enough "charge".

In addition to the servos, the following items (or similar items) are also required. The order numbers shown in parentheses are for Futaba servos.

Qty.	Items Required
4	6" Y-harness for elevator, rudder/steering, ailerons & flaps (FUTM4130)
4	6" Servo Extension for throttle, optional choke, ailerons & flaps (HCAM2701)
3	12" [305mm] Servo Extension for flaps & receiver switch (HCAM2711)
2	24" [610mm] Servo Extension for ailerons (HCAM2721)
2	Heavy Duty Switch Harness (FUTM4385)
2	Ernst Charge Receptacle 124 (ERNM3001)
1	Hobbico LiFeSource Battery 6.6V 3200mAh (Receiver) (HCAM6446)
1	Hobbico LiFeSource Battery 6.6V 1100mAh (Ignition) (HCAM6416)

Note: The length and quantity of servo extensions and Y-connectors may vary depending on the brand of radio you are using and the radio installation.

The instructions show the two aileron servos connected with a Y-harness that is plugged into the aileron channel of the receiver. If using a computer radio, the two aileron servos can be plugged into

separate channels of the receiver and mixed together. The two flap servos and the two elevator servos also use a Y-harness. If plugging the servos into separate channels, follow the instructions included with your radio system on how to mix the channels.

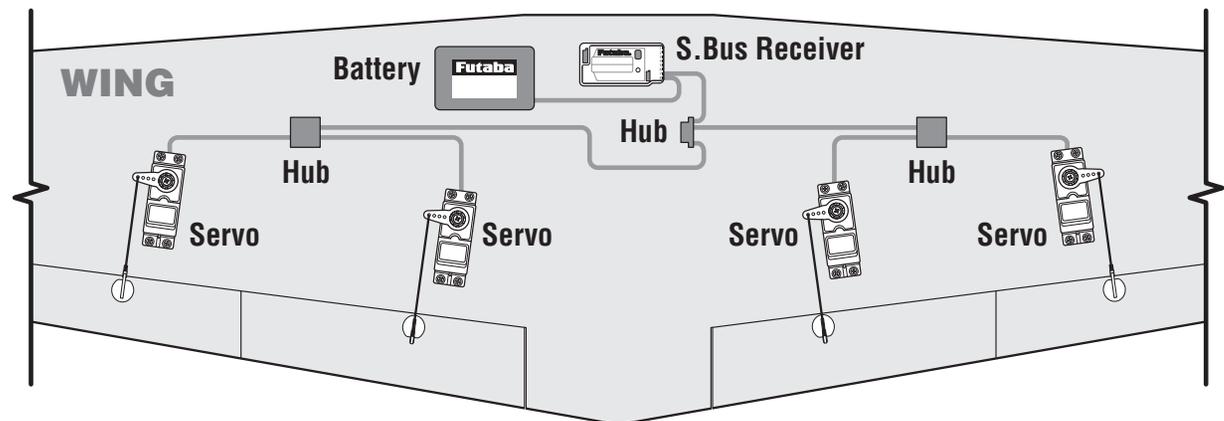
S.BUS SYSTEM

A cutting edge alternative to standard servo installation!

The innovative Futaba S.Bus system lets you unleash your flight system's full potential and cut down on cable clutter at the same time. It uses digital serial data communication technology to transmit control signals between your receiver and servos. A single S.Bus cable can carry signals to as many channels as your transmitter can handle. You no longer have to worry about plugging in the wrong servo to the wrong channel, because each servo knows what channel it is dedicated to in advance.

SBD-1 S.Bus Decoder Cables allow the use of existing analog and digital servos, too. By providing today's pilots with tomorrow's technology, the Futaba S.Bus system is nothing short of revolutionary.

S.BUS SYSTEM



HOW DO YOU INSTALL THE S.BUS SYSTEM?

Installation is actually simplified as compared to your normal system installation. Using the S.Bus system you plug a battery into the SBC-1 channel changing tool, using it to program which channel you want the servo to operate on.



Once programmed the servo will operate as required regardless of which lead it is plugged into. Do this for all of the servos that you want to operate on

the S.Bus system. Install the servos in the airplane and plug them into the S.Bus lead, piggybacking them one onto another. Once completed you plug one lead into the receiver for all of the servos and all of the servos will function as programmed. One lead operates up to 16 servos!



S.Bus leads are available in a number of different lengths to accommodate installation into any size airplane regardless of its complexity.

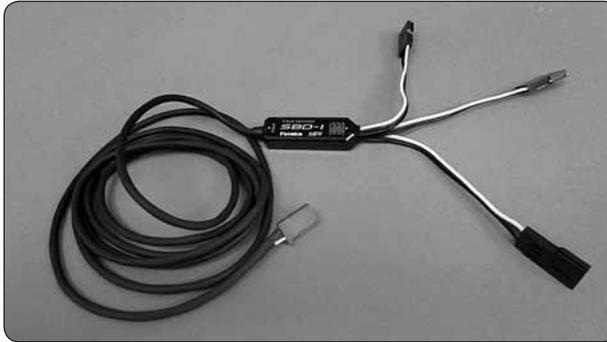


There are many choices for the S. Bus receivers; some are tiny 3 port receivers with others being up to 8 channels. The 8 channel inputs can be used as you would

normally set up a model, allowing you to split the model and have some of it set up as S.Bus while other servos are not using the S. Bus system. Something else to note is that some of the S. Bus servos and receivers are HV or High Voltage, meaning that you could run a straight 2S LiPo for your receiver battery.



Many servo choices are available for use in a wide variety and sizes of aircraft from micros to the largest models.



Your system is not limited to programming only through the SBC-1 channel changing tool and your transmitter. Utilizing the USB interface, the CIU-2, you can do all of the programming using your PC. Programming with this interface gives more flexibility and programming options than can be achieved with any other radio system. To utilize standard non S.Bus servos you simply use the S.Bus decoder instead of the S.Bus lead.

This is just the beginning of what this system can do. Would you like to operate the servos in the wing with a separate battery from the fuselage? With S.Bus you can do that! Run multiple servos – using only a single channel on your transmitter!!

WANT MORE INFORMATION?

Visit www.futaba-rc.com for more information, diagrams and helpful videos showing the complete operation of the S.Bus system.

RETRACTABLE LANDING GEAR

The Top Flite Giant P-47 Razorback ARF may be assembled with either the Robart pneumatic or electric

retracts. Following is the complete list of items required to install the Robart retracts:

PNEUMATIC RETRACTS

Qty.	Items Required
1	Robart #622P47 Top Flite Giant P-47 Pneumatic Retractable Main Landing Gear (ROBQ1636)
1	Robart #160LWC Retractable Tail Gear Assembly (ROBQ2225)
1	Robart #157VRX Large-Scale Deluxe Air Control Kit – incl. pressure tank, air line tubing, variable-rate air valve, T-fittings (ROBQ2305)
1	Robart #169 10' [3048mm] Red & Purple Pressure Tubing (ROBQ2369)
1 pkg.	Robart #190 Air Line Quick Disconnects (ROBQ2395)

Note: An air pump will also be required to pressurize the air tank. The Robart hand pump could be used, but is not practical because of the large capacity of the air tank in this model. A small, 12V electric pump is recommended and can be purchased at an automotive or hardware store.

ELECTRIC RETRACTS

Qty.	Items Required
1	Robart #622P47E Top Flite Giant P-47 Electric Retractable Main Landing Gear (ROBQ1637)
1	Robart #160LWCE Electric Retractable Tail Gear Assembly (ROBQ2226)
1	Robart #177E24S 24" Actuator Extension (ROBM0180)
1	Robart #177E12 12" Actuator Extension (ROBM0177)

ADDITIONAL ITEMS REQUIRED

REQUIRED HARDWARE AND ACCESSORIES

In addition to the items listed in the “*Decisions You Must Make*” section, following is the list of hardware and accessories required to finish the Top Flite Giant P-47 Razorback ARF. Order numbers are provided in parentheses.

- (2) Dubro #813 1/8" Fuel Line Barb (DUBQ0670)
- (1) Dubro #554 X-large Tygon Fuel Line (DUBQ0427)
- (1) R/C foam rubber (1/4" [6mm] (HCAQ1000) or 1/2" [13mm] (HCAQ1050)
- Optional Black paint for the plywood radial engine frame
- Propeller and spare propellers suitable for your engine or motor.
- Painted Pilot (GPMA2807) or Best Pilots at <http://www.bestpilots.typepad.com>
- Spinner Adapter (elec. only) (GPMQ4590)
- 10-32 x 1" Socket Head Cap Screw (Elec. only)

ADHESIVES AND BUILDING SUPPLIES

This is the list of Adhesives and Building Supplies that are required to finish the Giant P-47 Razorback ARF.

- 1/2 oz. [15g] Thin Pro™ CA (GPMR6001)
- 1/2 oz. [15g] Medium Pro CA+ (GPMR6007)
- Pro 30-minute epoxy (GPMR6047)
- Pro 6-minute epoxy (GPMR6045)
- Threadlocker thread locking cement (GPMR6060)
- Mixing sticks (50, GPMR8055)
- Mixing cups (GPMR8056)
- Epoxy brushes (6, GPMR8060)
- Denatured alcohol (for epoxy clean up)
- PT-56 canopy glue (PAAR3300)
- Milled fiberglass (GPMR6165)
- Masking tape
- Drill bits: 1/16" [1.6 mm], 5/64" [2 mm], 3/32" [2.4 mm], 7/64" [2.8 mm], 1/8" [3.2 mm], 3/16" [4.8 mm], 13/64" [5 mm], 1/4" [6.4 mm], 5/16" [8 mm]
- Small metal file
- Stick-on segmented lead weights (GPMQ4485)
- Silver solder w/flux (STAR2000)

- Revell #1 Lt Duty Alum Handle Knife w/Blade & Safety Cap (RMXR6903)
- Revell #11 Light Duty Blades (5-pack, RMXR6930)
- Curved-tip canopy scissors for trimming plastic parts (HCAR0667)
- Hobbico Soldering Iron 60 Watt (HCAR0776)

Covering tools

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

OPTIONAL SUPPLIES AND TOOLS

Here is a list of optional tools mentioned in the manual that will help you build the Giant P-47 Razorback ARF.

- 2 oz. [57g] spray CA activator (GPMR6035)
- CA applicator tips (HCAR3780)
- CA debonder (GPMR6039)
- Builder's Triangle Set (HCAR0480)
- 36" metal ruler
- Hobbico® High Precision Diagonal Cutter 5" (HCAR0630)
- Pliers with wire cutter (HCAR0625)
- Robart Super Stand II (ROBP1402)
- Panel Line Pen (TOPQ2510)
- Rotary tool such as Dremel
- Rotary tool reinforced cut-off wheel (GPMR8200)
- Servo horn drill (HCAR0698)
- AccuThrow™ Deflection Gauge (GPMR2405)
- CG Machine™ (GPMR2400)
- Precision Magnetic Prop Balancer (TOPQ5700)

IMPORTANT BUILDING NOTES

- Anytime a sheet metal screw is installed in wood, first install the screw, remove the screw and apply a couple of drops of thin CA in the hole to harden the threads. After the CA has cured, reinstall the screw.
- **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.

- The Giant P-47 Razorback ARF is factory-covered with Top Flite Flat MonoKote film. Should repairs ever be required, MonoKote can be patched with additional MonoKote purchased separately. MonoKote is packaged in six-foot rolls, but some hobby shops also sell it by the foot. If only a small piece of MonoKote is needed for a minor patch, perhaps a fellow modeler would give you some. MonoKote is applied with a model airplane covering iron, but in an emergency a regular iron could be used. A roll of MonoKote includes full instructions for application. Following are the colors used on this model and order numbers for six foot rolls.

Flat Olive Drab (TOPQ0510)

Flat Dove Gray (TOPQ0511)

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

KIT INSPECTION

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

Top Flite Product Support

3002 N Apollo Drive, Suite 1
Champaign, IL 61822

Ph: (217) 398-8970, ext. 5

Fax: (217) 398-7721

E-mail: airsupport@top-flite.com

ORDERING REPLACEMENT PARTS

Replacement parts for the Top Flite Giant P-47 Razorback ARF are available using the order numbers in the **Replacement Parts List** that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company. Not all parts are available separately (an aileron cannot be purchased separately, but is only available with the wing kit). Replacement parts are not available from Product Support, but can be purchased from hobby shops or mail order/Internet order firms. Hardware items (screws, nuts, bolts) are also available from these outlets.

To locate a hobby dealer, visit www.top-flite.com and click on "Where to Buy". Follow the instructions provided on the page to locate a U.S., Canadian or International dealer.

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

Mail parts orders 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.

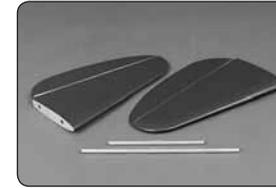
If additional assistance is required for any reason contact Product Support by e-mail at productsupport@top-flite.com, or by telephone at (217) 398-8970.



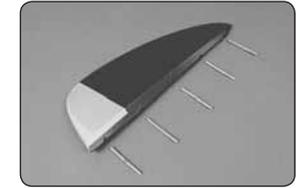
**TOPA1960
FUSELAGE**



**TOPA1961
WING**



**TOPA1962
HORIZONTAL STABILIZERS**



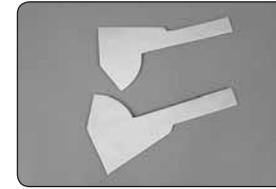
**TOPA1963
RUDDER**



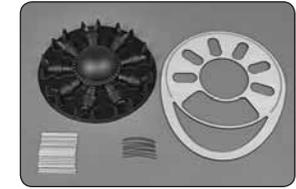
**TOPA1964
COWL**



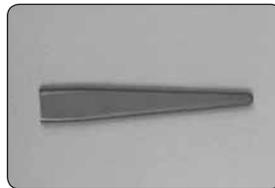
**TOPA1965
CANOPY**



**TOPA1966
GEAR DOORS**



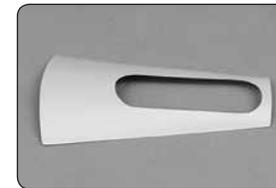
**TOPA1967
DUMMY ENGINE**



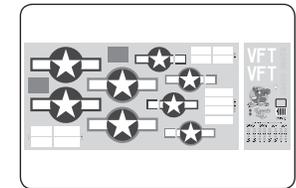
**TOPA1971
ANTENNA**



**TOPA1972
BELLY PAN**



**TOPA1973
TAIL HATCH**



**TOPA1974
DECALS**



**TOPA1975
SPINNER**

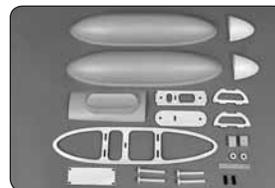


**TOPA1976
HATCH**

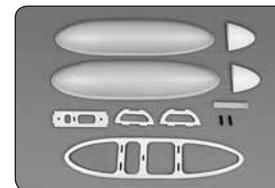


**TOPQ8410
COCKPIT KIT**

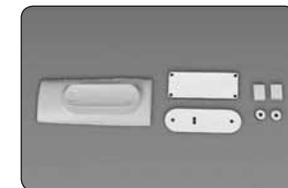
OPTIONAL



**TOPA1968
DROP TANK COMPLETE**



**TOPA1969
DROP TANK ONLY**



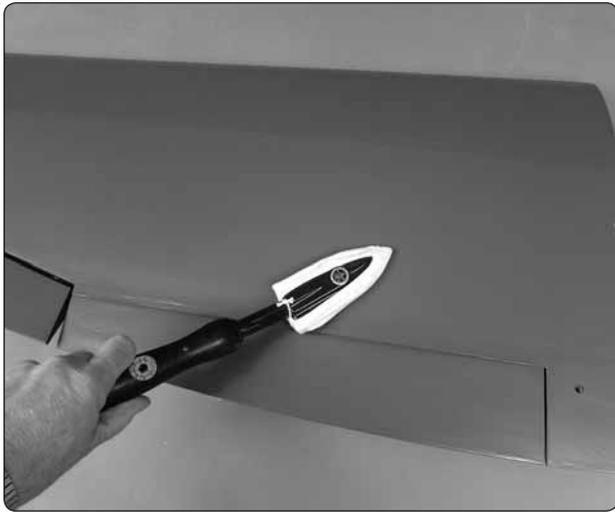
**TOPA1970
DROP TANK RELEASE**

ASSEMBLE THE WINGS

HINGE THE AILERONS

Start with the left wing so the assembly matches the photos the first time through.

1. Pull on the ailerons and elevators, making sure the hinges are secure.

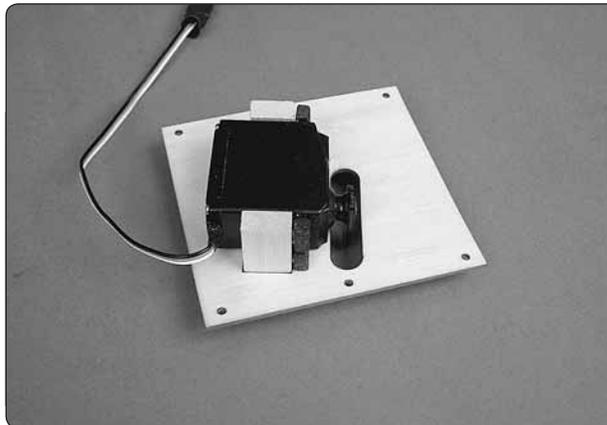


2. If necessary, use a covering iron with a covering sock to go over the wing, flap and aileron to remove any wrinkles. The best method to remove the wrinkles is to glide the iron over the covering until the wrinkles disappear, then go over the area again, pushing down on the iron to bond the covering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

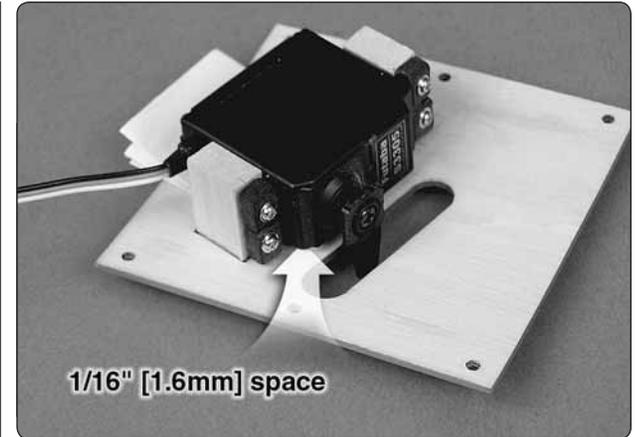


The P-47 had many attributes that led to its reputation. One of the most important was its durability in combat. Oftentimes the P-47 would bring pilots home with missing cylinders, blown-off wing tips and large portions of tail surfaces missing. The P-47's internal systems were very durable and well protected.

MOUNT THE AILERON SERVOS



1. Install a servo arm on the aileron servo. Connect the servo to your receiver. Switch on the transmitter and center the servo arm. Position the aileron servo on the aileron servo hatch cover as shown with the servo arm centered in the opening. Set the two 5/16" x 5/8" x 13/16" [7.9 x 15.8 x 20.6mm] hardwood blocks in the embossed servo block locations, checking that they are correct. If not, mark the new location.
2. Use 6-minute epoxy to glue the two blocks to the bottom of the servo hatch over the embossed servo block locations. Thoroughly coat the end of the blocks and allow them to set for a few seconds while the blocks absorb the epoxy. Then, recoat the blocks. Use clamps to hold the blocks to the servo hatch tray.

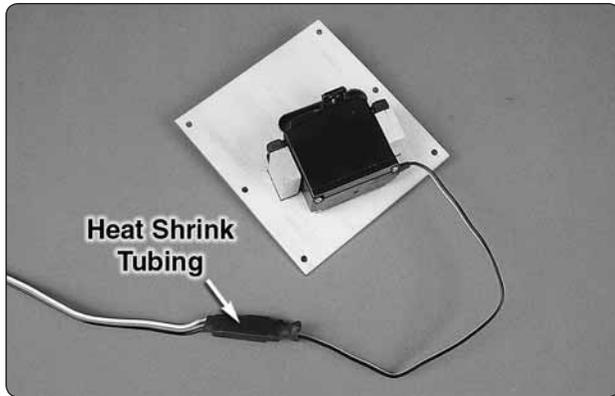


3. Once the epoxy has cured, remove the clamps. Place a 1/16" [1.6mm] spacer, such as a piece of cardstock or a piece of paper folded several times, under the servo and between each mounting block. After the servo is installed the spacer will be removed, providing adequate spacing for vibration isolation.
4. Drill 1/16" [1.6mm] holes through the blocks for the servo mounting screws. Mount the servo to the blocks with the screws that came with the servo. Remove the servo mounting screws and apply a couple of drops of thin CA in each hole to harden the threads. Allow the CA to fully harden. Then, reinstall the servos and remove the spacer.



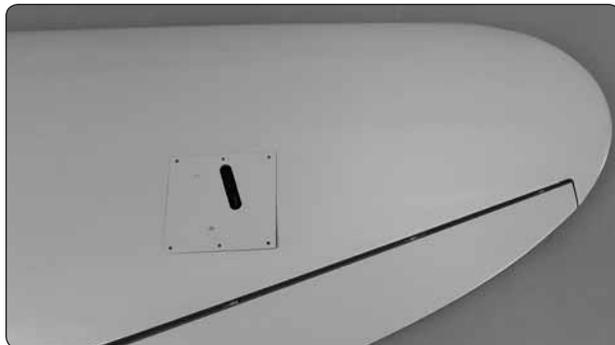
5. Drill 1/16" [1.6mm] holes through the blocks at the two hole locations on the top of the aileron servo hatch. Install two #2 x 3/8" [9.5mm] flat head sheet

metal screws to secure the servo mounting blocks to the aileron servo hatch. Use thin CA to harden the screw threads.



❑ ❑ 6. Connect a 24" [610mm] servo extension wire to the aileron servo. Cut a piece of heat shrink tubing in half and slide it over the servo connections. Shrink the tubing by applying heat to the tubing.

❑ ❑ 7. Use the string in the wing to pull the aileron servo wire through the wing.

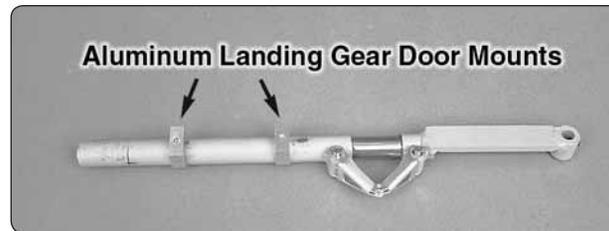


❑ ❑ 8. Place the aileron servo hatch with the servo in the wing. Be certain that the hatch is positioned correctly as shown. Secure the hatches using six #2 x 3/8" [9.5mm] flat head sheet metal screws. Use thin CA to harden the screw threads.

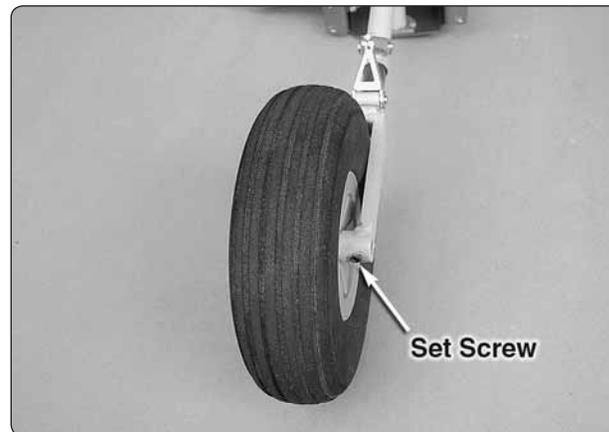
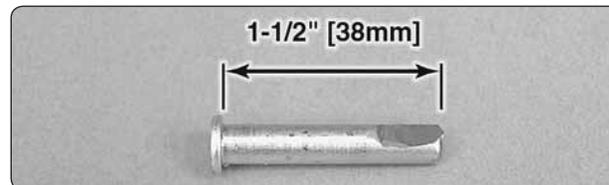
❑ ❑ 9. Go back to step 1 and install the right aileron servo following the same procedure.

MOUNT THE RETRACTS

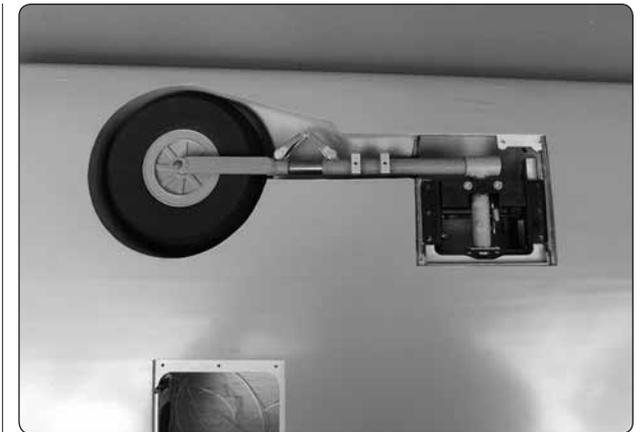
Install the left retract first.



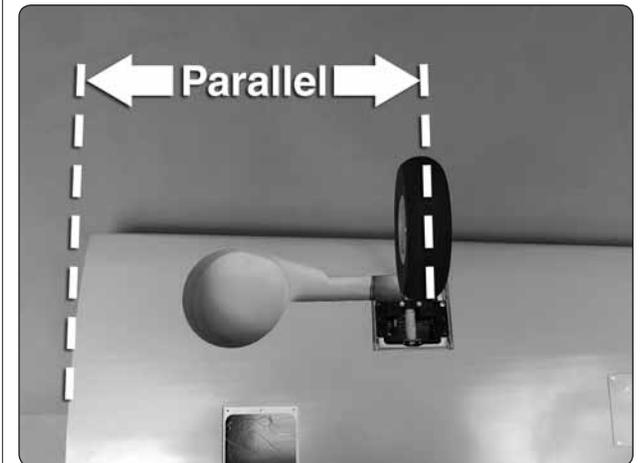
❑ ❑ 1. Use a hex wrench to loosen the strut mounting bolt and remove the strut. Slide two aluminum landing gear door mounts onto the strut and reinstall the strut in the strut mount.



❑ ❑ 2. Trim the axle that is included with the Robart retracts to 1-1/2" [38mm] long. File a flat spot at the end of the axle. Insert the axle through the included 5" [127mm] wheel and into the retract. Apply a drop of threadlocker to the 10-32 x 3/16" [4.8mm] set screw, included with the retract, and tighten the set screw onto the flat of the axle. Make sure that the wheel rotates freely.

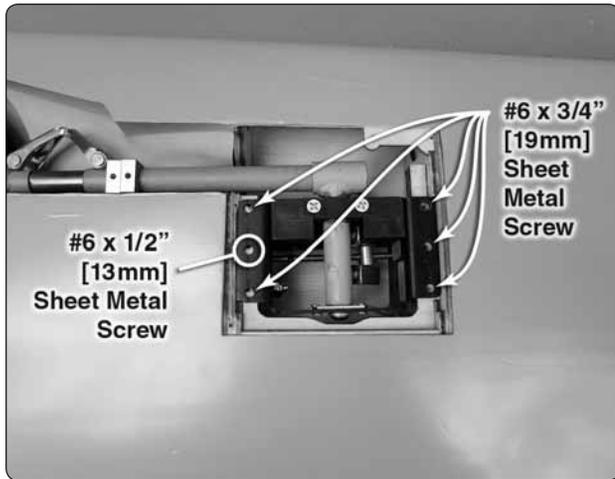


❑ ❑ 3. Test fit the retract unit with the wheel into the wing. Position the retract so the wheel is centered in the wheel well. Adjust the strut position in the retract body as necessary to achieve the correct spacing all the way around the wheel.



❑ ❑ 4. Extend the retract. View the wheel from directly above. Adjust the strut so that the wheel is parallel to the root of the wing. Lock the strut in position by applying a drop of threadlocker to the threads and securely tightening the bolts at the top of the strut.

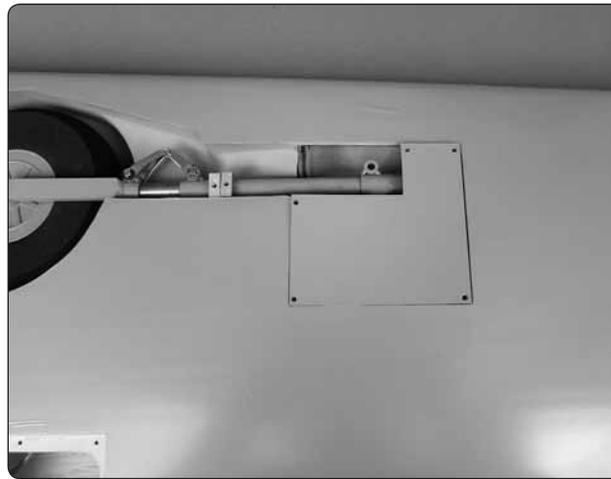
❑ ❑ 5. Double check that the wheel will fully retract into the wing. Extend the retract to make sure it does not interfere with any part of the wing and that the retract is operating smoothly.



❑❑ 6. Hold the retract in the wing. Using the mounting holes as a guide, drill 7/64" [2.8mm] pilot holes into the retract rails. **Caution:** Do not inadvertently drill into the electric actuator when you get to the middle hole. Mount the retracts with five #6 x 3/4" [19.1mm] sheet metal screws, one in each corner and one in the middle as shown. Use one #6 x 1/2" [12.7mm] sheet metal screw in the hole over the electric actuator.

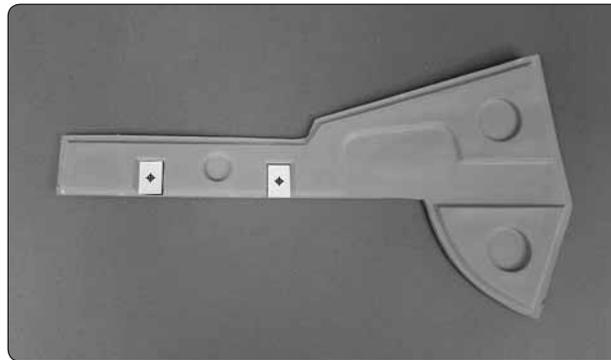
❑ 7. Remove the six screws and retract and apply a couple of drops of thin CA in the holes. Attach a 12" Actuator Extension to the retract. If installing pneumatic retracts, attach the airline to the retracts.

❑ 8. Connect the actuator extension or air lines to the string in the retract bay. Guide the extension or air lines through the front of the retract bay, through the flap bay and out the hole in the top of the wing. Also pull the aileron servo lead out the hole. Tape the actuator extension or air lines and aileron servo extension to the top of the wing. Remount the retract in the wing.



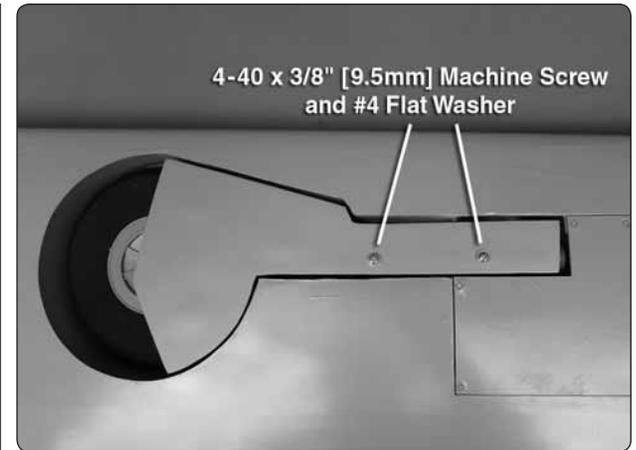
❑❑ 9. Set the retract cover over the retract and drill a 1/16" [1.6mm] pilot hole using the holes in the cover as a guide.

❑❑ 10. Mount the retract cover to the wing with five #2 x 3/8" [9.5mm] flat head sheet metal screws.



❑❑ 11. Cut two of the landing gear door drill guides from the back of the manual. Place the drill guides in the rectangle recesses of the landing gear door. Place the landing gear door on a piece of scrap wood and drill a 1/8" [3.2mm] hole through the door at the marked hole location.

❑❑ 12. Adjust the position of the two landing gear door mounts so that they align with the flats on the landing gear door when the door is positioned in the landing gear opening.



❑❑ 13. Install a #4 flat washer on 4-40 x 3/8" [9.5mm] machine screw. Insert the machine screw through one of the holes in the gear door and thread it into the landing gear door mount. Note that it tightens against the landing gear strut before it tightens against the gear door. Install the second machine screw to hold the gear door in position. Check to make sure that the gear door is flush with the bottom of the wing. 1.5mm thick rectangular plywood spacers have been included to space the gear doors out if needed. Both screws will need to be shortened, a little at a time, so that they tighten against both the landing gear strut and the gear door. Be sure to use threadlocker on the screws.

❑ 14. Return to step 1 and mount the retract in the right wing.



The P-47 was manufactured by Republic Aircraft Corporation, which at one time was named Seversky Aircraft Corporation, started by two fellow Russians, Alexander De Seversky and Alexander Kartveli.

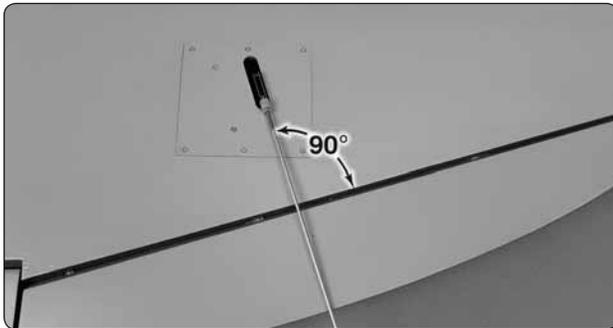
INSTALL THE FLAP SERVOS



1. Install the flap servos following the same procedure used to install the aileron servos. Note that the flap servos face the same direction.
2. Connect a 12" [305mm] servo extension wire to the flap servo. Secure the extension to the servo with a piece of heat shrink or electrical tape.
3. Route the flap servo leads to the root of the wing and out the hole in the top of the wing.

INSTALL THE AILERON AND FLAP PUSHRODS

Do the left aileron first. Temporarily plug the aileron servo into the receiver. Switch on your transmitter and plug a receiver battery into the receiver. Center the aileron trim.

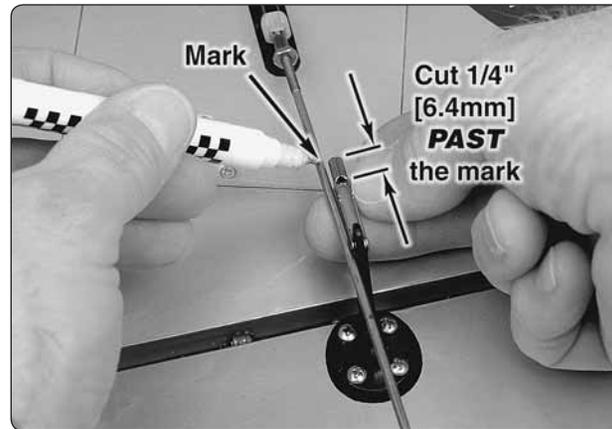


1. Slide a silicone clevis retainer over a 4-40 threaded metal clevis. Thread a 4-40 nut followed by the 4-40 metal clevis, threaded 12 turns onto a 4-40 x 12" [305mm] metal pushrod. Attach the clevis to

the **aileron** servo arm 5/8" [15.9mm] from the center of the arm.



2. Position the control horn so that it is inline with the pushrod and over the plywood mounting plate. The pushrod holes in the control horn should be aligned with the hinge line of the aileron. On the aileron, mark the four mounting holes. Remove the control horn and drill a 5/64" [2mm] pilot hole at each mark. Do not drill completely through the aileron. Attach the control horn using four #4 x 1/2" [12.7mm] sheet metal screws. Use thin CA to harden the holes.



3. Install the metal solder clevis in the second hole from the end of the control horn. Center the aileron servo and aileron. Mark the pushrod where it meets the solder clevis. Remove the pushrod and the solder clevis and cut the pushrod 1/4" [6.4mm] **past** the mark. Solder the solder clevis to the pushrod using the techniques described in the following **Hot Tip**.

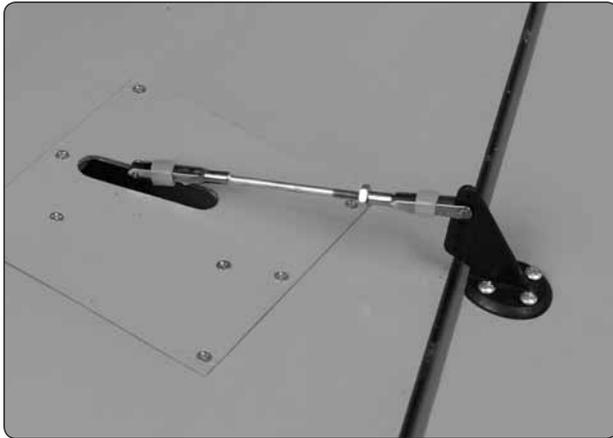


HOW TO SOLDER

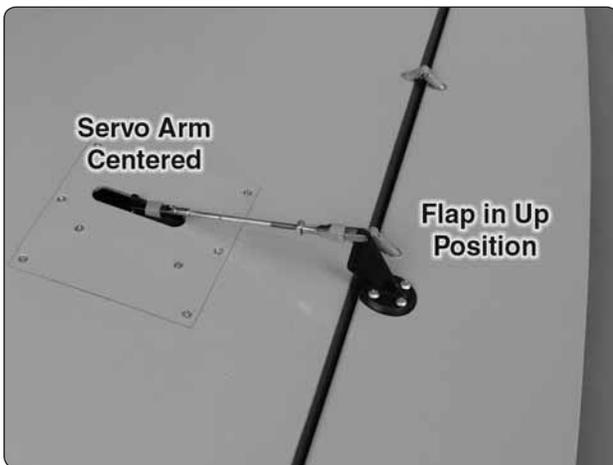
1. Use denatured alcohol or other solvent to thoroughly clean the pushrod. Roughen the end of the pushrod with coarse sandpaper where it is to be soldered.
2. Apply a few drops of soldering flux to the end of the pushrod, then use a soldering iron or a torch to heat it. "Tin" the heated area with silver solder by applying the solder to the end. The heat of the pushrod should melt the solder – not the flame of the torch or soldering iron – thus allowing the solder to flow. The end of the wire should be coated with solder all the way around.
3. Place the clevis on the end of the pushrod. Add another drop of flux, then heat and add solder. The same as before, the heat of the parts being soldered should melt the solder, thus allowing it to flow. Allow the joint to cool naturally without disturbing. Avoid excess blobs, but make certain the joint is thoroughly soldered. The solder should be shiny, not rough. If necessary, reheat the joint and allow to cool.
4. Immediately after the solder has solidified, but while it is still hot, use a cloth to quickly wipe off the flux before it hardens. **Important:** After the joint cools, coat the joint with oil to prevent rust. **Note:** Do not use the acid flux that comes with silver solder for electrical soldering.



This is what a properly soldered clevis looks like – shiny solder with good flow, no blobs and flux removed.



- □ 4. Slide a silicone clevis retainer over the solder clevis. Reinstall the aileron pushrod with the threaded clevis attached to the control horn.



- □ 5. Assemble and connect the flap pushrods following the same procedure. We installed the pushrod in the outer hole of the control horn and the hole 3/8" [9.5mm] from the center of the servo arm. **Note:** With the flap fully retracted "up", the servo arm is centered on the servo.

- 6. Return to step 1 and install the aileron and flap pushrods on the right wing.

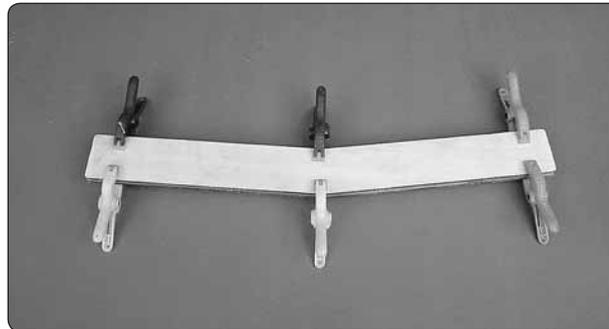


The Thunderbolt was a massive airplane, the biggest and heaviest single engine, single-place fighter ever built. The engine, the Pratt & Whitney 18 cylinder twin-row radial, developed 2,000 HP and was the most powerful engine at the time. However, in turn, it needed a highly efficient duct system for its super-charger. The designer, Alexander Kartvile, designed the duct system first, then built the fuselage around it.

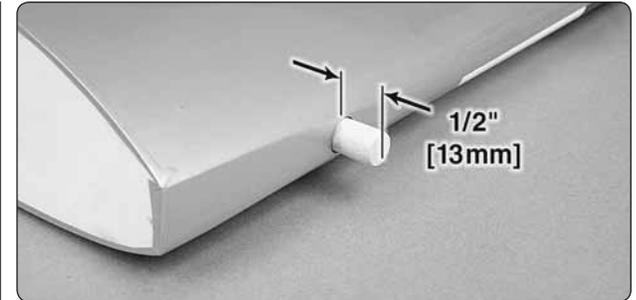
JOIN THE WING

Note: Keep the retracts in the retracted (up) position so they do not extend and retract as you handle the wing.

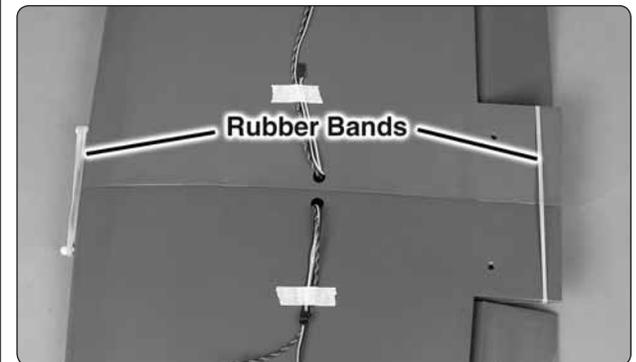
- 1. Clean the aluminum wing joiner with denatured alcohol to remove any possible contaminant.



- 2. Gather everything required for gluing the wing joiner and wing together including 30-minute epoxy, mixing sticks, epoxy brush, clamps, #64 rubberbands, 12" [305mm] long dowel or wire, denatured alcohol and small paper towel squares. Mix up a 1/2" oz. [14.7cc] of 30-minute epoxy. Apply a generous amount of epoxy to one side of each of the plywood wing joiners. Sandwich the aluminum wing joiner between the two plywood wing joiners. Hold the joiner together with clamps. Use a paper towel dampened with denatured alcohol to wipe off any excess epoxy around the edges.



- 3. Use 6-minute epoxy to glue the two 3/8" [9.5mm] diameter forward wing dowels in the leading edge of the wing. The wing dowels should protrude approximately 1/2" [12.7mm] from the wing. Also glue the 1/4" [6.4mm] aft root rib guide dowel in the left wing half. Clean off any excess epoxy before it cures.



- 4. Once the epoxy has cured, remove the clamps from the wing joiner and sand off any excess epoxy you may have missed. Test fit the wing joiner in each wing half making sure that both wings halves fit together at the root without any gap. Trial fit clamping the wing

together with rubberbands around the wing dowels and the trailing edge.

❑ 5. Remove the rubberbands and separate the wing halves. Remove the wing joiner. Mix 2 oz. [59.1cc] of 30-minute epoxy. **Working quickly**, pour a generous amount into the joiner pocket of one wing half. Use your wire or dowel to thoroughly distribute the epoxy, coating all surfaces inside the joiner pocket. Coat the root rib and one half of the wing joiner that goes into the wing. Insert the joiner in the wing. Proceed **immediately** to the next step.

❑ 6. Coat the joiner pocket in the other wing half and the other end of the wing joiner. Join the wing halves together. Then, stand the wing on end with one of the wing tips resting on the floor. Use a piece of R/C foam or something similar to cushion and stabilize the wing so it won't slide around.

❑ 7. With the wing resting on end, use paper towel squares to wipe off any excess epoxy as it squeezes out. Wrap the rubberbands around the wing dowels and the aft end of the wing. Add several strips of masking tape to tightly hold the wings together as you continue to wipe off excess epoxy as it squeezes out. Be certain the leading and trailing edges of the wing **accurately** align. Do not disturb the wing until the epoxy has fully cured.

Pneumatic Retracts: Join the matching air lines from each wing half with a couple of T-fittings that came with the Robart air control kit. Cut two 10" [254mm] pieces of air line (also from the control kit) and fit each line to the T-fittings. Connect one quick-connector **with** an O-ring to one of the air lines and one of the quick connectors **without** an O-ring to the other line. This will prevent improper connection to the quick-connectors on the air valve when mounting the wing to the fuselage.

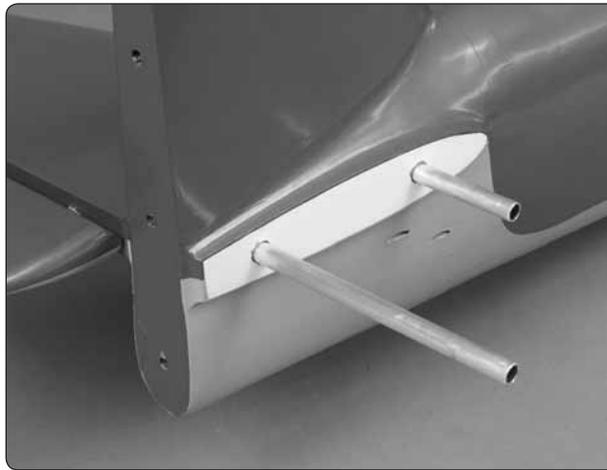
Electric Retracts: The retract controller can be mounted on top of the wing with double sided tape (not included). Plug the retracts into the retract controller.



Various prototypes and incarnations of the P-47 began to materialize at Republic Aircraft around 1940. One of the first designs recognizable as a P-47 was the XP-44 *Rocket*. One of the engine performance features carried over from Seversky was the gear-driven supercharger and later a turbo-supercharger.

ASSEMBLE THE FUSELAGE

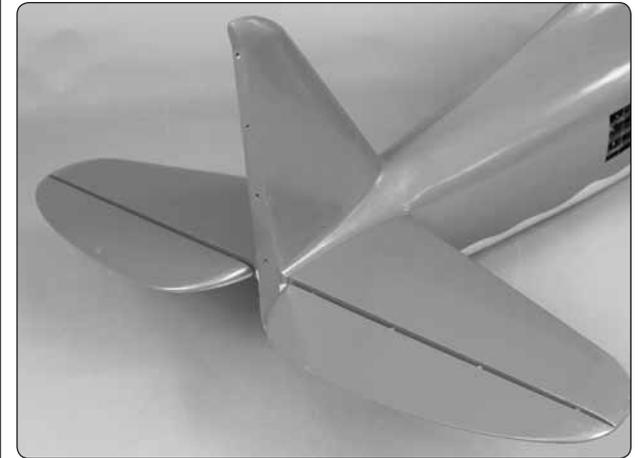
INSTALL THE STABILIZER AND RUDDER



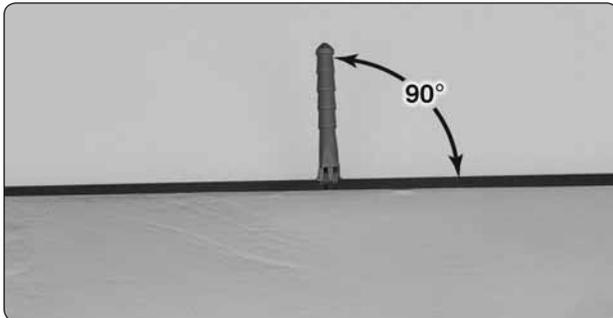
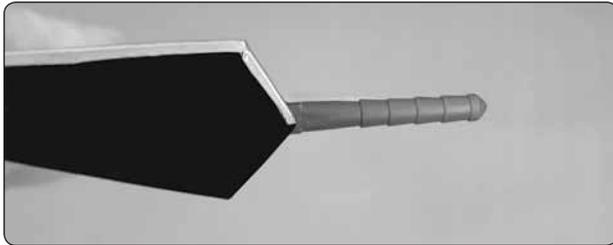
❑ 1. Test fit the two aluminum stabilizer tubes in the fuselage and slide the stabilizers on the tubes. The shorter tube goes in the front hole. If the aluminum tubes are too tight to slide through the holes, take a sharp hobby knife and gently scrape the inside of the holes. During the manufacturing process a small amount of resin or filler may be left behind in the hole.

❑ 2. Test fit the stabilizer halves. Once you are satisfied with the fit of the stabilizer halves, remove the stabilizer halves and the joiner tubes. Use medium grit sandpaper to roughen up the aluminum tubes.

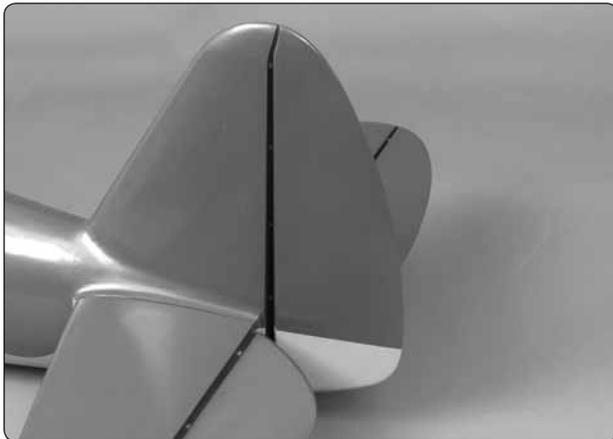
Clean the tubes with denatured alcohol and insert both tubes back into the fuselage until the end exits on the opposite side by approximately 1" [25.4mm].



❑ 3. Gather everything required for gluing the stabilizer halves to the fuselage, including 30-minute epoxy, mixing sticks, epoxy brush, 12" [305mm] long dowel or wire, masking tape, denatured alcohol and small paper towel squares. Mix up 3/4 oz. [22.1cc] of 30-minute epoxy. Apply a generous amount of epoxy to the long side of the aluminum joiner tubes. Pull the tubes through the fuselage so that they are close to centered. Pour a small amount of epoxy into both holes of one of the stabilizer halves and using a dowel or wire, coat the inside of the holes. Apply epoxy to the root rib of the stabilizer and the fuselage. Insert the end of the aluminum tubes with epoxy on them into the stabilizer and press the stabilizer against the fuselage. Wipe off any excess epoxy that may have squeezed out before it runs down the fuselage. Quickly repeat the process on the other side. Wipe off any excess epoxy with a dampened paper towel and denatured alcohol. Use pieces of masking tape to hold the stabilizer tight against the fuselage until the epoxy cures.

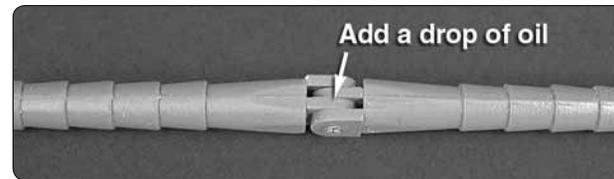


- ❑ ❑ 4. Without using any glue, install five hinges into the rudder. Note that the pivot point of each hinge must align with the center of the leading edge. To achieve this alignment, the hinges will be fairly deep in the rudder. Also note that the hinges must be perpendicular to the leading edge.

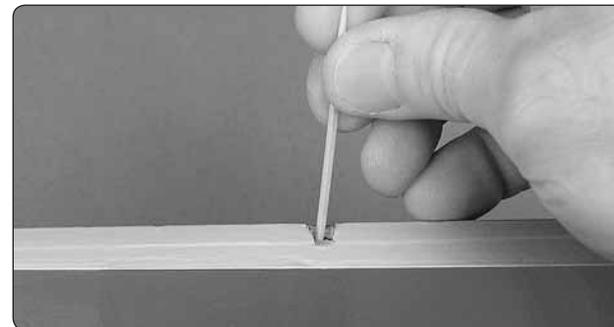


- ❑ ❑ 5. Again without glue, test fit the rudder to the fin. Move it left and right a few times to align the hinges. The rudder doesn't have to move very far, only 2" [50.8mm] left and 2" [50.8mm] right measured at the widest part of the rudder at the trailing edge. If there

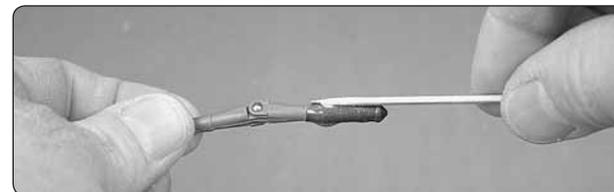
is too much resistance, or if you are not able to move the rudder left and right 2" [50.8mm], widen the gap slightly between the rudder and the fin.



- ❑ ❑ 6. Remove the rudder and all the hinges. Add a small drop of oil to the pivot point on the hinges. This will prevent the epoxy from adhering to the pivot point. Make sure oil does not get on the gluing surface of the hinge. If it does, clean the oil off with a paper towel square dampened with denatured alcohol.



- ❑ ❑ 7. Mix up approximately 1/4 oz. [7.4cc] of 30-minute epoxy. Use a toothpick to thoroughly apply the epoxy in the holes in the fin and rudder. Use the toothpick to get the epoxy out of the opening of the holes in the rudder and fin so it doesn't get into the hinge pin. Wipe away any excess epoxy around the outside of the holes with a couple of the small paper towel squares dampened with denatured alcohol.



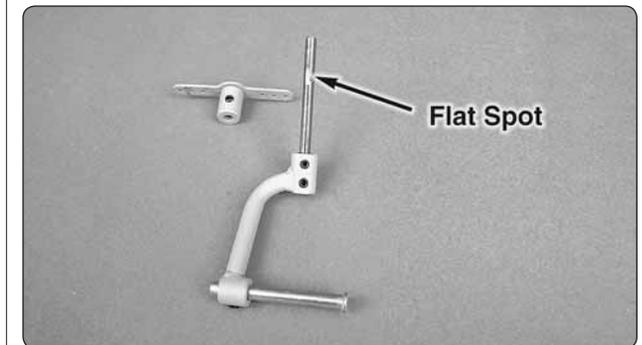
- ❑ ❑ 8. Use the toothpick to apply epoxy to the ends of the rudder hinges that go into the fin. Insert each

hinge into the fin and wipe away any excess epoxy that squeezes out of the hole.

- ❑ ❑ 9. Apply epoxy to the other end of the hinges. Join the rudder to the fin, pushing the hinges only about 3/4 of the way into the rudder. Use a toothpick to wipe away any epoxy that squeezes out. Then, fit the rudder the rest of the way in.

- ❑ ❑ 10. Move the rudder left and right a few times to align the hinges and make certain that the rudder deflects left and right enough. Use a small piece of masking tape to hold the tip of the rudder in alignment with the tip of the fin. Allow the epoxy to fully cure.

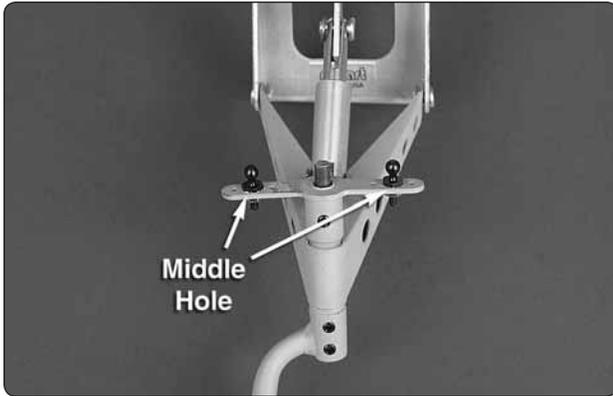
MOUNT THE RETRACTABLE TAIL GEAR



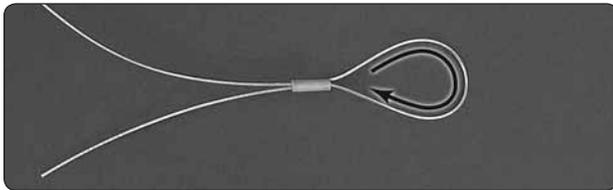
- ❑ 1. Remove the steering arm from the Robart #160LWC retractable tail gear assembly (not included). File a flat spot near the top of the shaft for the set screw in the steering arm to lock onto. Re-install the steering arm on the shaft with a drop of threadlocker and the set screw.

- ❑ 2. File another flat spot near the bottom of the shaft for one of the set screws in the strut. Tighten both set screws with a drop of threadlocker on each. Be certain the steering arm and the axle in the strut remain parallel with each other. Make adjustments to the flat spots if necessary.

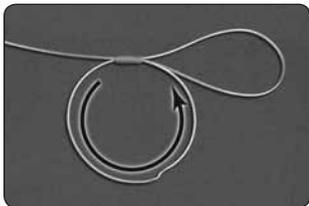
- ❑ 3. Enlarge the hole through the 1-3/4" [44mm] tail wheel with a #9 [5mm] drill. Cut the axle included with the Robart retractable tail gear to the correct length, then file a flat spot on it and mount it to the strut.



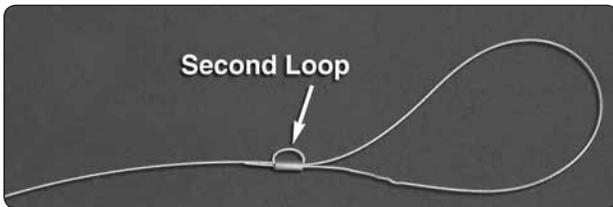
❑ 4. Enlarge the middle hole in both sides of the steering arm with a 3/32" [2.4mm] drill. Insert a 2-56 ball link ball in the hole. Secure each ball with a 2-56 nut and a drop of threadlocker.



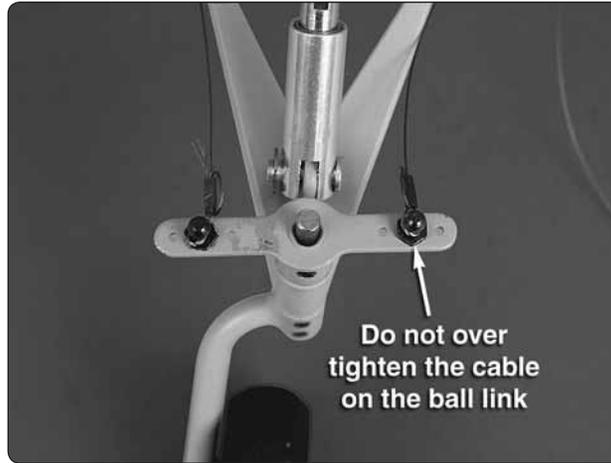
❑ 5. Use wire cutters to cut the supplied braided cable into two equal lengths. Slide a small copper tube (called a swage) over one end of the cables, then guide the end of the cable back through.



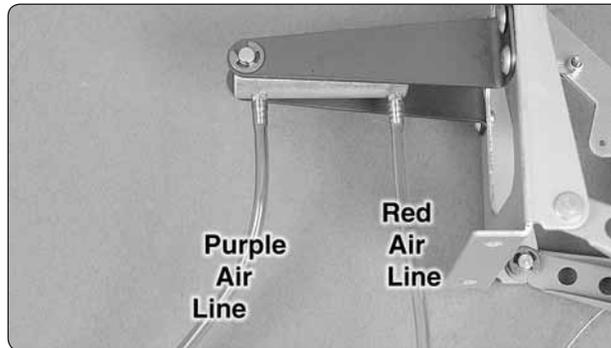
❑ 6. Wrap the cable back around the swage and back through the swage.



❑ 7. Use pliers to pull the cable from the first loop to reduce the size of the second loop.

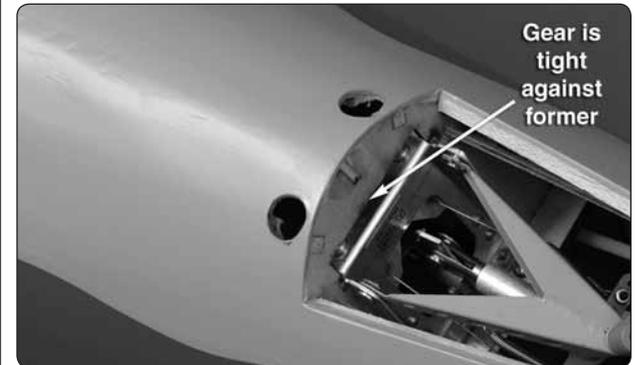
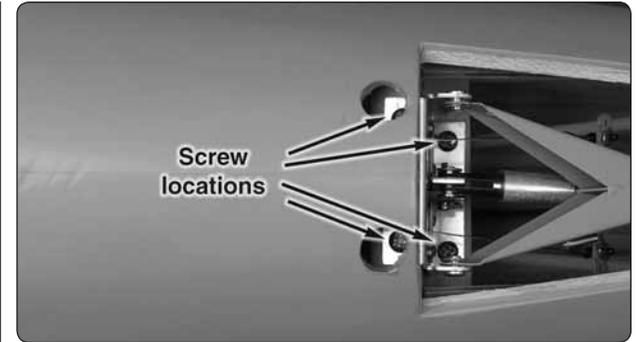


❑ 8. Now pull on the long end of the cable to reduce the size of the first loop. Slip the loop over one of the ball link balls on the steering arm. Tighten the loop until it is small enough to remain secure on the ball, yet may still be pried off. Squeeze the swage with pliers. Connect the other cable to the other ball link ball the same way.



❑ 9. Connect a 24" actuator extension to the electric retractable tail gear or air lines to the pneumatic retractable tail gear.

❑ 10. Place the tail gear in the fuselage while simultaneously guiding the pull/pull cable through the white plastic guide tubes. Also route the actuator extension or air lines through the fuselage.



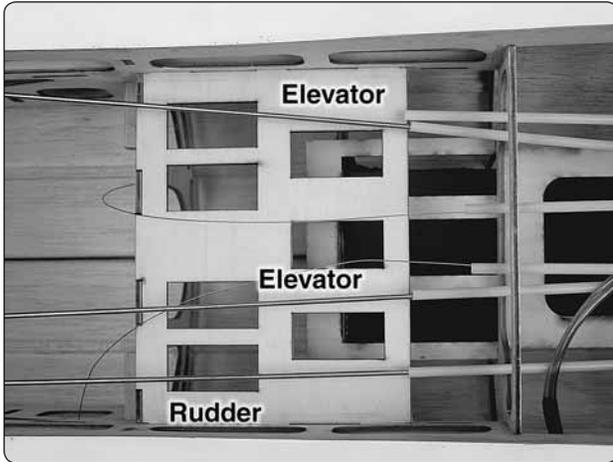
❑ 11. Drill four 3/32" [2.4mm] holes through the rails for mounting the tail gear. If your drill bit is not long enough to reach the rail nearest the top of the fuselage, use medium CA to temporarily glue a 3/32" [2.4mm] drill bit in a 1/8" [3.2mm] brass tube. After drilling the holes, the drill bit can be removed from the tube by heating the tube.

❑ 12. Mount the tail gear in the fuselage with four #6 x 1/2" [12.7mm] sheet metal screws.

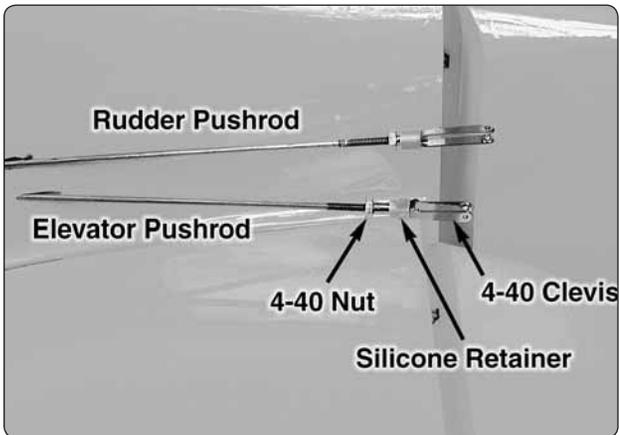


After the British policy of giving names to aircraft had caught on in the U.S., the XP-47B was dubbed "Thunderbolt" by C. Hart Miller, Republic's Director of Military Contracts. Republic officially approved the name.

INSTALL THE ELEVATOR & RUDDER SERVOS



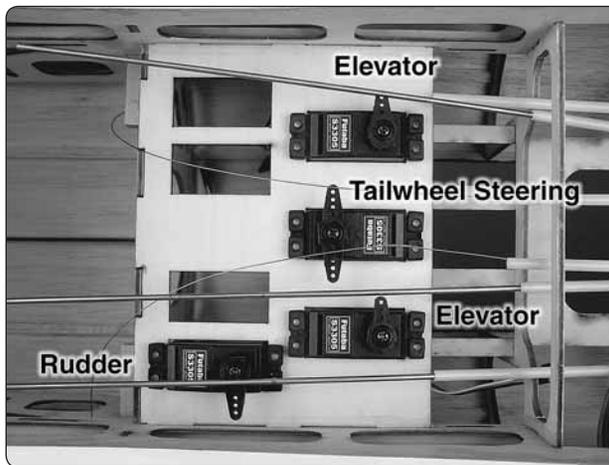
❑ 1. Hold your engine, inverted, up to the firewall. Determine which side the throttle and choke is on. Insert the three 4-40 x 48" (1220 mm) metal pushrods in the three outer pushrod tubes. The rudder pushrod should be installed on the opposite side as the throttle and choke.



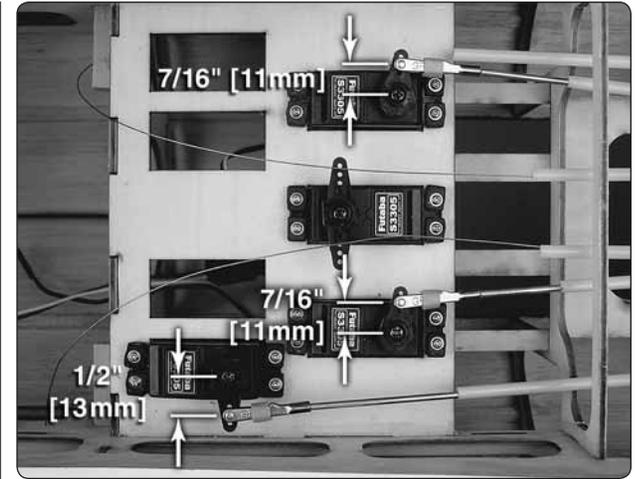
❑ 2. Thread a 4-40 nut, threaded clevis and a silicone clevis retainer, 12 turns, onto both elevator pushrods and the rudder pushrod.



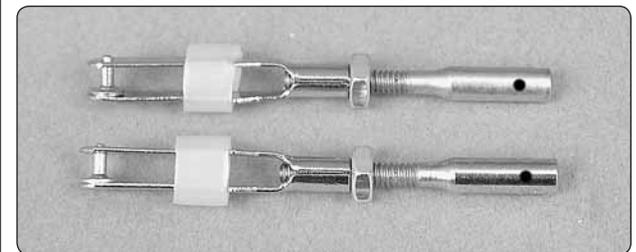
❑ 3. Mount the control horns to the elevators and the rudder. Follow the same procedure used for the ailerons, by drilling 3/32" [2.4mm] holes and using #4 x 1/2" [12.7mm] sheet metal screws. Attach the elevator clevis in the third hole from base of the control horn. Install the rudder clevis in the second hole from the base of the control horn. Don't forget to harden the holes with thin CA after first installing, then removing the screws.



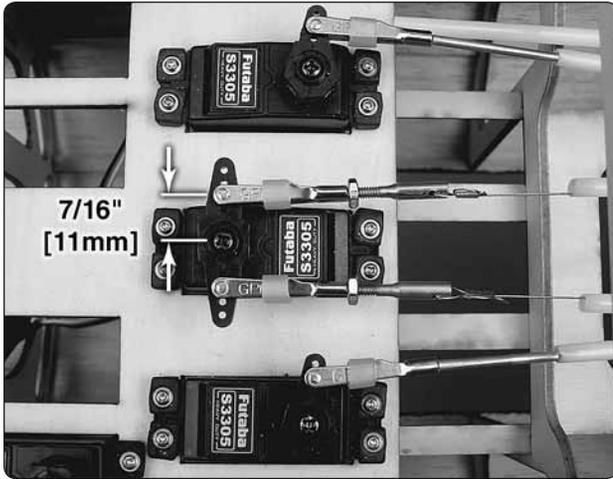
❑ 4. Place two elevator, one rudder and one tailwheel steering servo in the servo tray as shown. Make three one-arm servo arms and one two-arm servo arm from the servo arms that came with your servos. Center the servo arms and the trim on your transmitter.



❑ 5. Install solder clevises on the elevator servo arms in the hole 7/16" [11.1mm] from the center of the servo arm. Install a solder clevis on the rudder servo arm in the hole 1/2" [12.7mm] from the center of the servo arm. Following the same procedure that was done for the aileron and flap pushrods, mark the elevator and rudder pushrods where they are to be cut for the solder clevises. One at a time, remove the threaded metal clevis from the control horn end, remove the pushrod from the fuselage, cut it to the correct length and solder a metal solder clevis on the end. Reinstall the pushrod from the front and connect the solder clevis to the servo arms. Reinstall the threaded metal clevis and 4-40 nut. **Don't forget to use a silicone clevis retainer on all the clevises.**



❑ 6. Thread a 4-40 nut and a 4-40 metal clevis, 12 turns, on to each of the 4-40 rigging couplers. Slide a silicone clevis retainer over each clevis. Install the clevises on the tailwheel steering servo arm in the holes 7/16" [11.1mm] from the center of the servo arm.



❑ 7. Connect the tailwheel steering servo to the rudder servo with a Y-harness. Center the servo arm and the tailwheel gear. Install a swage on each cable, securing it following the same procedure used on the tail gear. Use a pliers to crimp the swage tightly on the cable.

❑ 8. Mount the receiver on/off switch and charge receptacle in a strategic location where it won't interfere with anything inside the fuselage and where it will not get coated with engine exhaust outside the fuselage. For electric power, the switch and charge receptacle can be mounted under the hatch.



❑ 9. Cut in half one of the 12" (305 mm) long hook material and one of the 12" (305 mm) loop material.

Overlap by 1" (25.4 mm) a 6" (152 mm) long piece of hook and loop material. Route the hook and loop material through the two slots in the forward fuselage on the same side as the rudder servo. Wrap the receiver battery in R/C foam rubber and secure it to the side of the fuselage with the hook and loop material. Connect the receiver battery to the receiver switch. **Use the included heat shrink material to secure the connectors. Make sure the receiver battery is secure.**

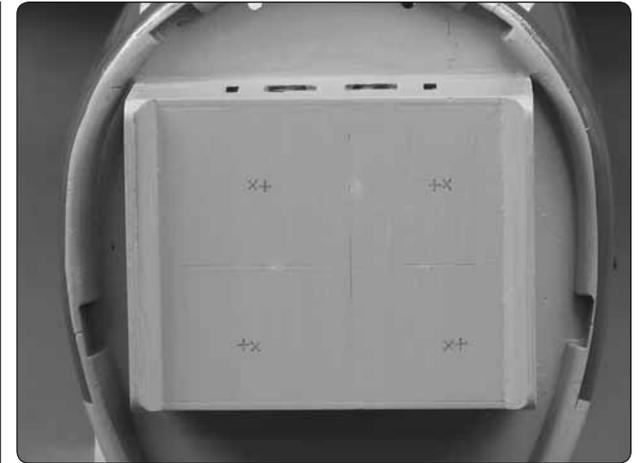
❑ 10. Mount the receiver on the other side of the fuselage using hook and loop material. Connect the receiver switch and the servos to the receiver. If you're still using a 72 MHz receiver, route the receiver antenna through the remaining pushrod tube. Attach a strain relief on the antenna. For 2.4 GHz receivers, follow the instructions included with the receiver for routing the antennas.



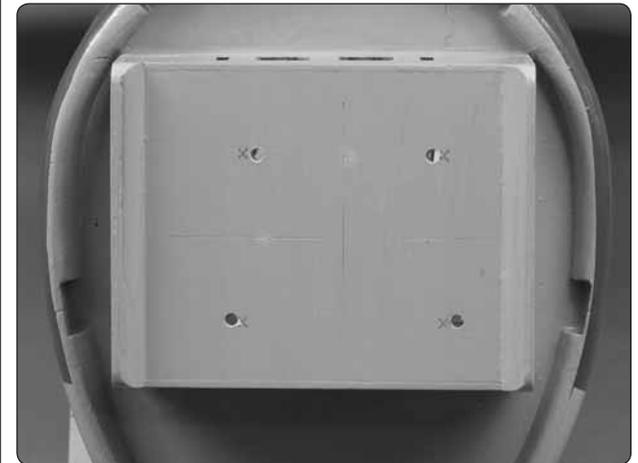
Early production Thunderbolts were not without teething pains typical of any new aircraft. Takeoff runs were long (nearly a half-mile to clear a fifty foot obstacle) and there were several electrical and hydraulic glitches, not to mention the unfamiliarity of a totally new design. One fighter group damaged or wrecked half of the P-47s received.

GAS ENGINE INSTALLATION

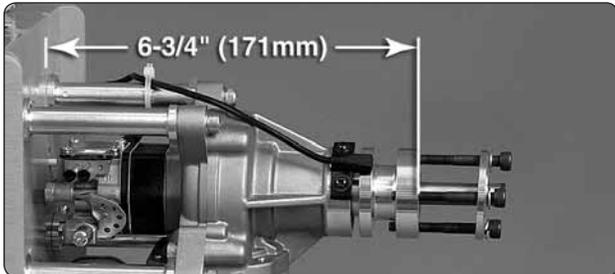
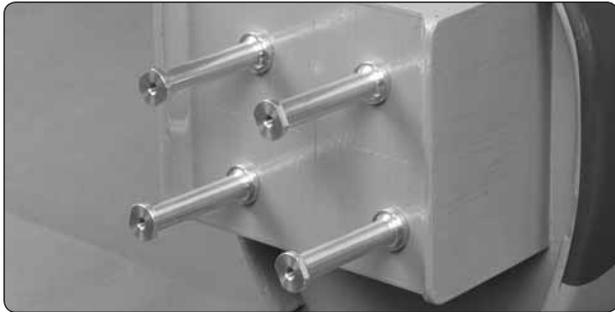
If you are powering the P-47 Razorback with an electric motor, skip ahead to **ELECTRIC MOTOR INSTALLATION** on page 21.



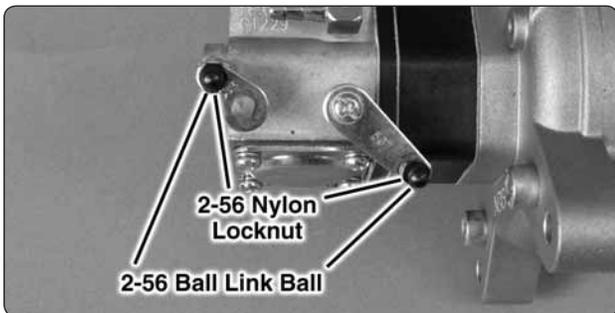
❑ 1. The firewall has two sets of engine mounting bolt patterns embossed on it. The "+" are for the DLE-55 Rear Exhaust and DLE-61 Side Exhaust gas engines and the "X" are for the DLE-55 Side Exhaust gas engine and RimFire 65 Electric Motor. In the back of this manual we provided a paper template for mounting the O.S. GT 60 gas engine. If you are installing an engine with a different mounting bolt pattern, the firewall also has crosshairs embossed on it to help locate the correct mounting location.



❑ 2. Drill a 13/64" (5 mm) hole through the firewall at each of the appropriate locations marked with an "X" or "+".



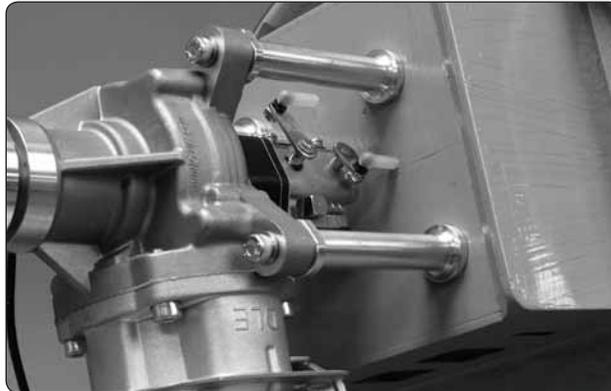
❑ 3. Install the engine mounting bolts and fender washers from the back of the firewall. The engine mounting hardware is not included in the P-47 ARF. It should be included with the engine. If your engine did not include fender washers, we recommend purchasing them. The larger washers will help distribute the load from the engine. Apply a drop of thread locker to each bolt before installing them in the engine standoffs. For a reference, once the engine is installed, the front of the engine drive washer should be approximately 6-3/4" (171 mm) from the front of the firewall.



❑ 4. Install a 2-56 ball link ball on the throttle arm and on the choke arm and secure them with 2-56 nylon locknuts. Also remove the throttle arm and position

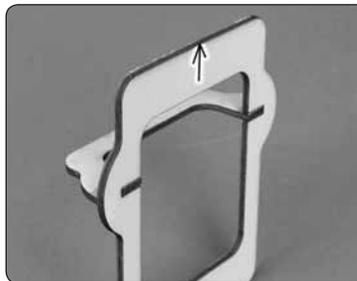
it as shown. Apply thread locker to the screw before reinstalling it.

❑ 5. Temporarily install the engine inverted on the aluminum standoffs.

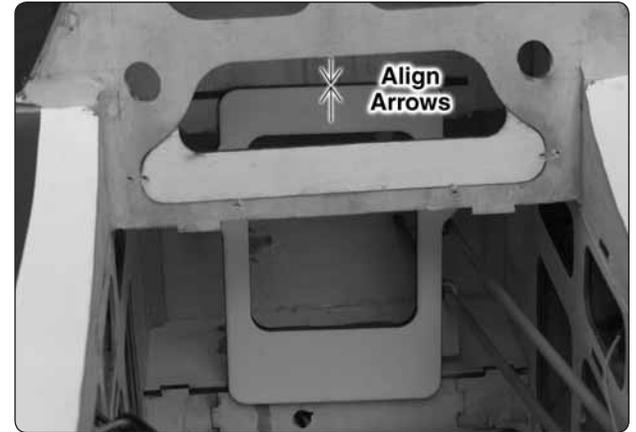


❑ 6. Snap a nylon ball socket onto both pivot balls. Center the choke and throttle arms and mark the firewall where the pushrods will need to pass through. Also mark the location where the fuel line will need to pass through the firewall.

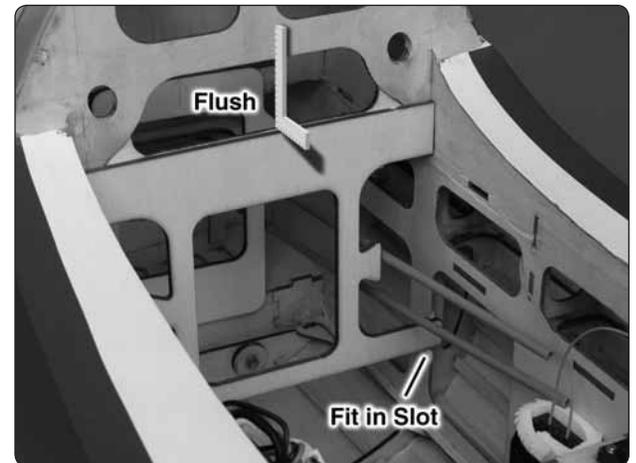
❑ 7. Drill a 3/16" (4.8 mm) hole at the marks on the firewall for the throttle and choke pushrods. It may be easier to remove the engine before drilling the holes. Cut the gray 24" (610 mm) outer pushrod tube in half. Use medium sandpaper to roughen the outer pushrod tube. Clean the tubes with denatured alcohol and insert the tubes into the previously drilled holes in the firewall so that the tube is flush with the front of the firewall. Use thin CA to glue the tubes to the firewall. Also drill a 5/16" [8mm] hole at the location for the fuel line. Once the holes are drilled, reinstall the engine, applying a drop of threadlocker to all the mounting bolts as they are installed.



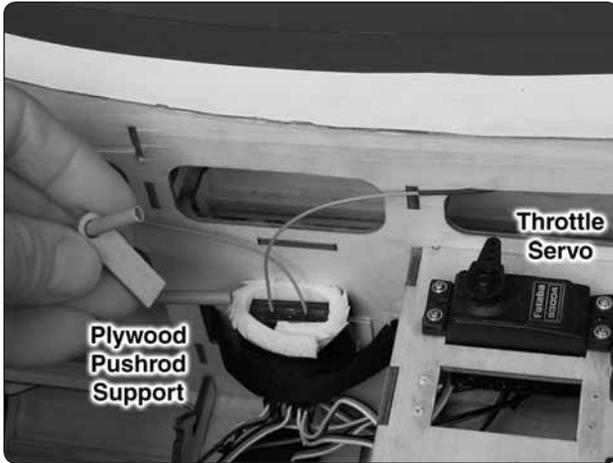
❑ 8. Glue the forward fuel tank stop to the forward fuel tank support. Make sure the embossed arrow is on the opposite side of the fuel tank stop.



❑ 9. Glue the forward fuel tank support to the firewall, aligning the embossed arrows. The edge of the tank support should align with the two slots.



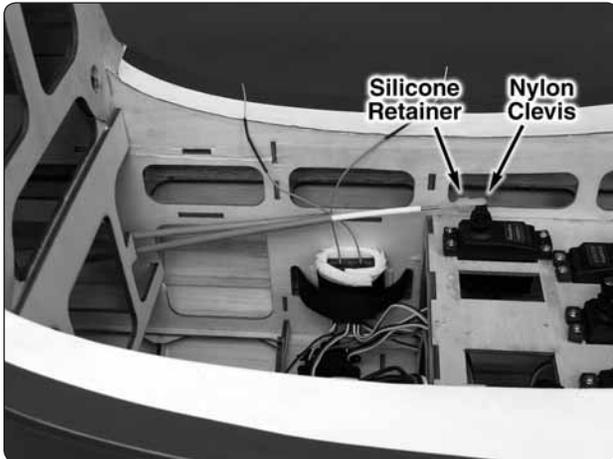
❑ 10. Glue the aft fuel tank support to the #2 former. It should be flush with the edge of the lightening hole and fit into the slots in the fuselage side



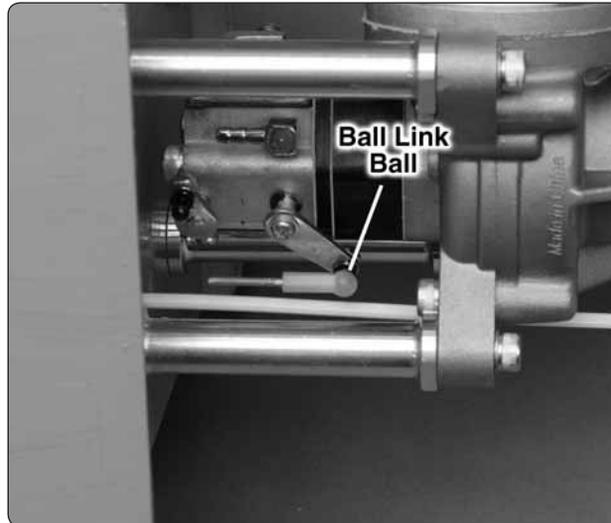
□ 11. Mount the throttle servo in the servo tray and slide a plywood pushrod support onto the outer pushrod tube.



□ 13. Glue the plywood pushrod support so that the pushrod is inline with the servo arm and on the outside of the aft fuel tank support.



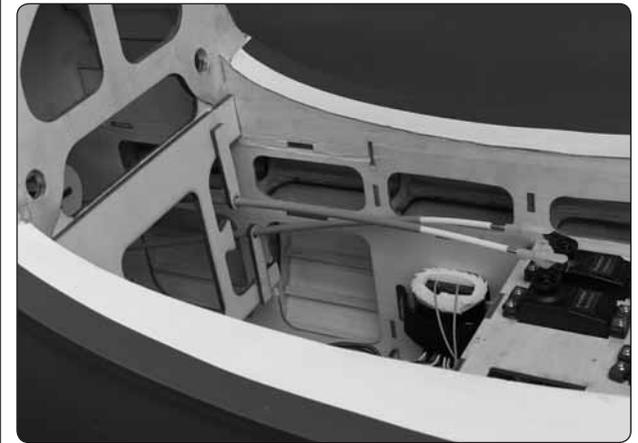
□ 12. Thread a 2-56 x 1" [25.4mm] threaded rod approximately 3/8" [9.5mm] into the end of the white inner pushrod tube. Thread a nylon clevis 14 turns onto the end of the threaded rod. Slide a silicone clevis retainer over the clevis. Inset the white inner pushrod tube in the throttle's outer pushrod tube. Attach the clevis to the throttle servo arm.



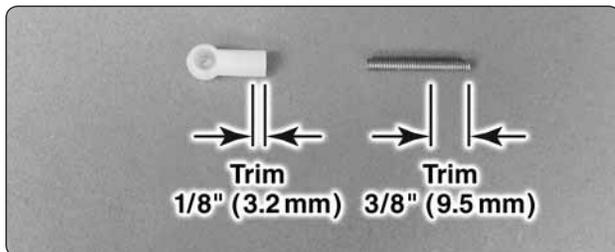
□ 14. Thread the nylon ball link socket 14 turns onto the second 2-56 x 1" [25.4mm] threaded rod. Attach the ball link socket to the ball link ball on the throttle arm.



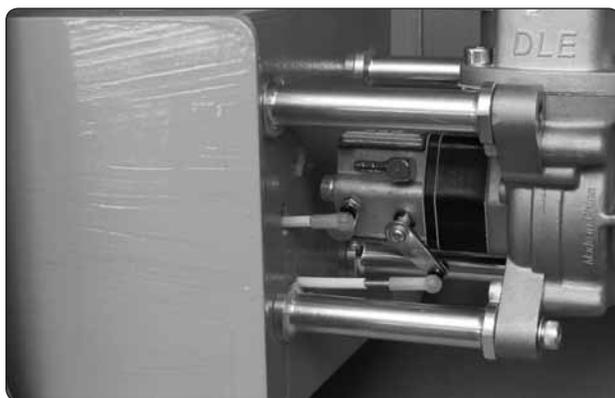
□ 15. Position the throttle stick so that it is centered on the transmitter. Adjust the throttle servo arm so that it is centered on the throttle servo. Move the throttle arm on the carburetor so that the throttle is open approximately half way. Mark and cut the white pushrod tube to length. Remove the ball link socket from the throttle arm and thread it into the cut end of the white pushrod tube. Reattach the clevis to the throttle servo arm and the ball link socket to the ball link ball. Make adjustments as needed so that the throttle opens and closes completely.



□ 16. Install the choke servo, 2-56 x 1" (25.4 mm) threaded rod, white inner pushrod tube and nylon clevis following the same procedure used for the throttle pushrod.



❑ 17. Trim approximately 1/8" (3.2 mm) from the end of the nylon ball socket before threading the 2-56 x 1" (25.4 mm) threaded rod into the end. Also trim 3/8" (9.5 mm) from the end of the threaded rod.



❑ 18. Install the nylon ball socket and threaded rod on the choke following the same procedure used for the throttle pushrod.



❑ 19. Place the ignition module on a piece of R/C foam rubber (not included) and secure it to the top of the firewall box with hook and loop material. The

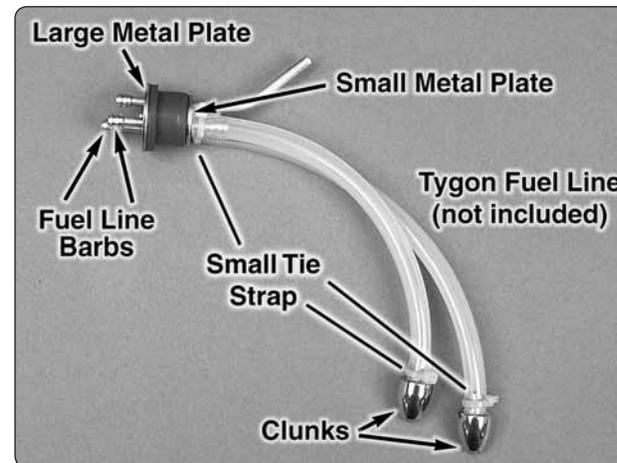
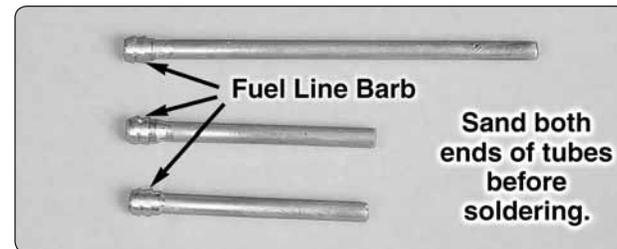
excess wire can be secured with a piece of rubber band (not included) glued to the firewall box.

❑ 20. Wrap the ignition battery in R/C foam rubber and attach it to the bottom of the firewall box with hook and loop material. Install the ignition switch in the side of the fuselage at the front.

ASSEMBLE AND INSTALL THE FUEL TANK

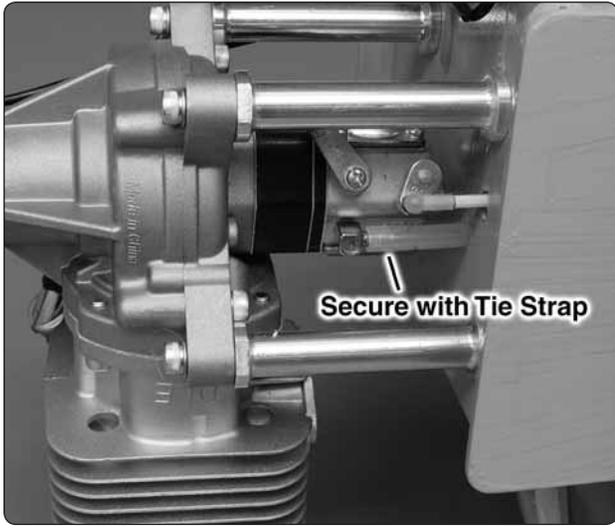


❑ 1. If installing the pneumatic retracts attach a 12" (305 mm) piece of airline tubing to the pressure tank. Insert the pressure tank into the fuselage. A couple of dabs of silicone sealant such as Shoe Goo® can be applied to the pressure tank supports to hold the tank in position but still allow it to be removed if necessary. Secure the pressure tank to the supports with four #64 rubberbands.

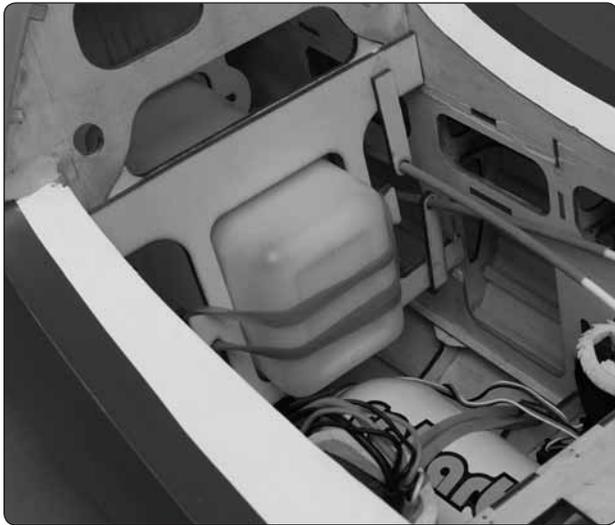


❑ 2. Assemble the fuel tank stopper assembly with the fuel tubes as shown. The easiest way is to first solder a fuel line barb (not included) onto **one** end of all three tubes. Insert the tubes into the stopper with the metal plates, and then solder a barb onto the other end of the two short tubes. Bend the vent tube and connect the pickup and fueling/defueling lines (not included) to the short tubes. Connect the clunks to the lines and secure the lines to the clunk and brass tubing with the included small tie straps.

❑ 3. Install the fuel tank stopper assembly in the fuel tank. Check that the clunks move around freely in the fuel tank. Tighten the fuel tank stopper screw. Refer to the next step for the orientation of the fuel tank. Then mark the top of the fuel tank where the vent tube is located.

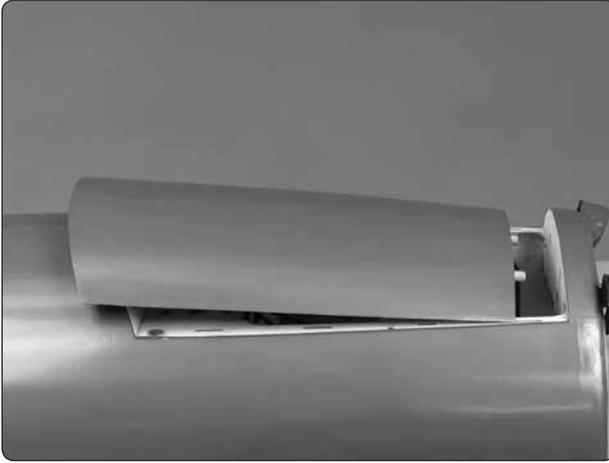


Secure with Tie Strap

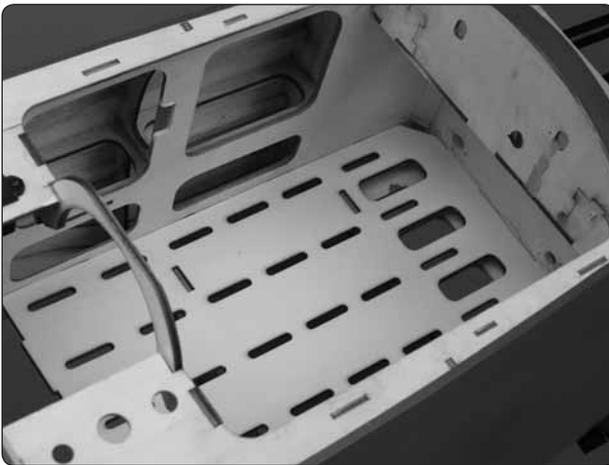


❑ 4. Install fuel line on the three tubes from the fuel tank. Secure the tubes with small tie straps. Insert the fuel tank in the fuselage, making sure the vent tube is towards the top of the fuselage. Connect the fuel line from the pickup to the carburetor. The other two fuel lines can be routed out the bottom of the cowl. Insert an aluminum fuel plug in the fueling/defueling line. Secure the fuel tank in the fuselage with two #64 rubberbands. Proceed to page 23, **INSTALL THE AIR RETRACT CONTROLS.**

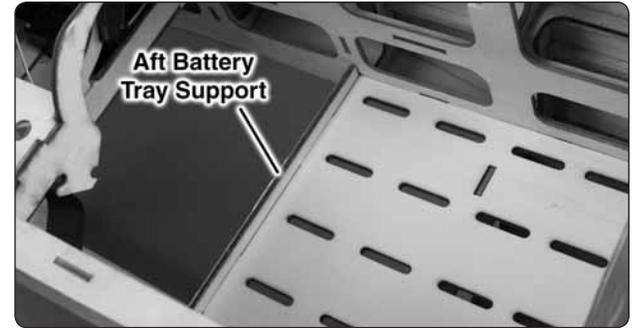
ELECTRIC MOTOR INSTALLATION



❑ 1. The removable battery hatch is secured at the factory with four #2 x 3/8" (9.5 mm) sheet metal screws. Remove the four screws from the inside of the fuselage. Using a sharp knife blade, locate and carefully cut the battery hatch from the fuselage. Extra Olive Drab covering has been provided to cover the edges of the hatch and the fuselage along the cut.



❑ 2. Insert the tabs on the front of the battery tray in the firewall. Note that the front of the battery tray is angled to match the right thrust built into the firewall. Check that the tray is seated on the formers and then securely glue it in the fuselage.

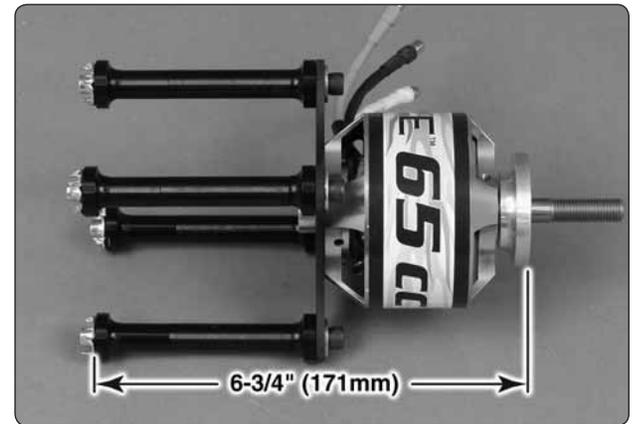


Aft Battery Tray Support

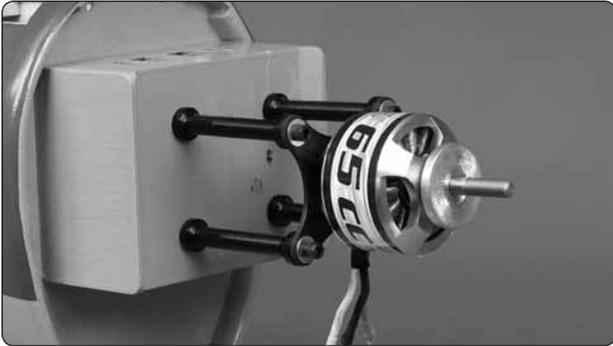
❑ 3. Glue the aft battery tray support to the battery tray and the fuselage sides.



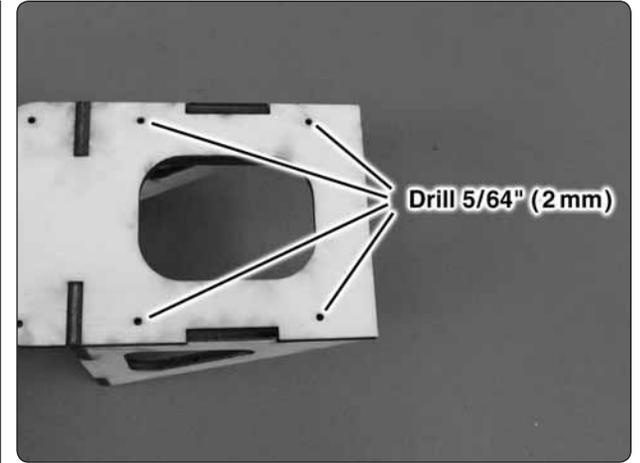
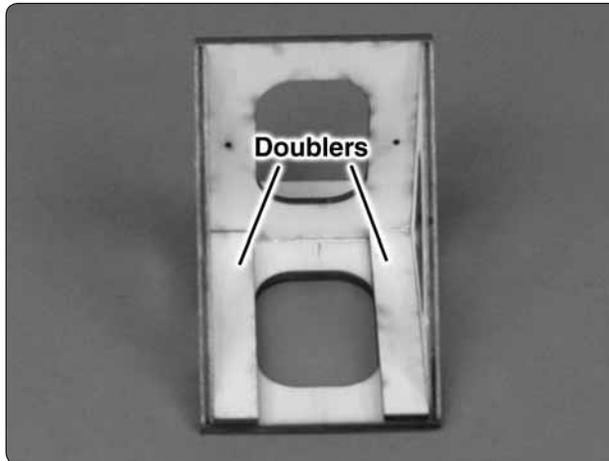
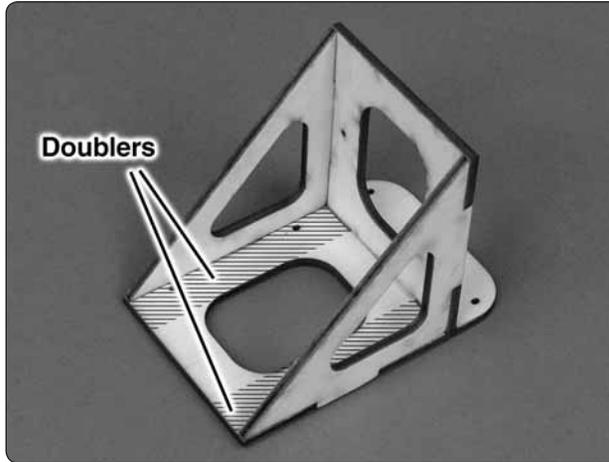
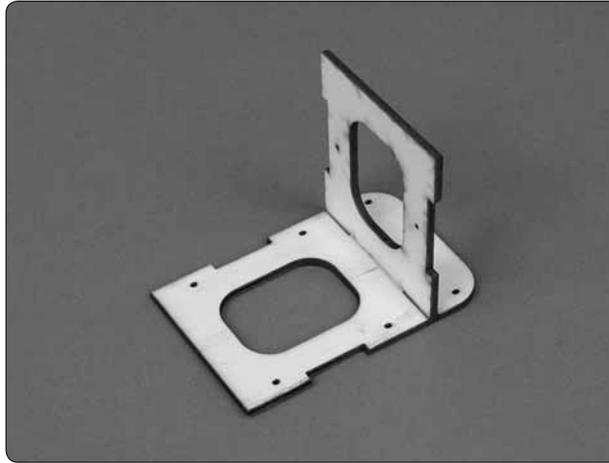
❑ 4. Mount the receiver on/off switch and the charge receptacle in the tray under the battery hatch.



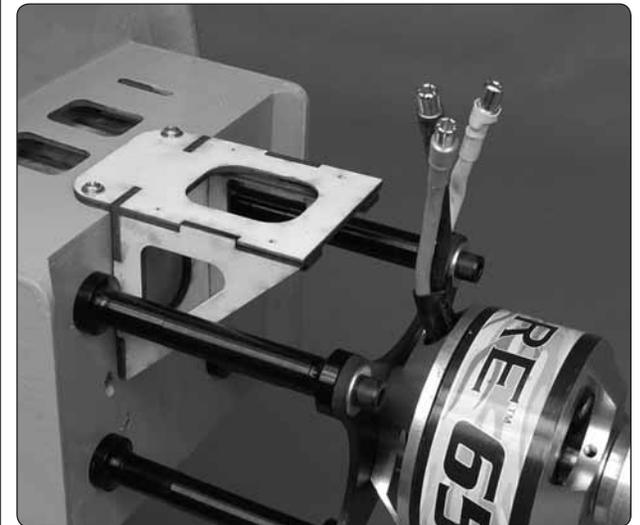
❑ 5. Install the motor mount on the RimFire 65 following the instructions included with the XX-Large Stand Off Motor Mount. The front of the drive washer should be 6-3/4" (171mm) from the back of the stand off.



❑ 6. Follow the Stand Off Motor Mount instructions to install the motor on the firewall box. The RimFire 65 motor uses the embossed 'X' pattern on the front of the firewall box. Drill a 5/16" [8mm] hole at each mark.



❑ 7. Assemble the ESC mount as shown. Drill 5/64" (2mm) pilot holes through the doubler as shown.



❑ 8. Position the ESC mount on the firewall box and drill four 5/64" (2mm) pilot holes through the firewall box. (Two on top and two in the front.) Attach the ESC mount with #4 x 1/2" (12.7mm) sheet metal screws and #4 flat washers. Harden the screw holes with thin CA.



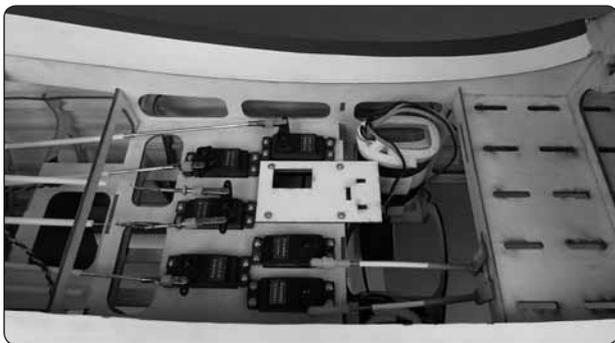
- ❑ 9. Attach the ESC to the ESC mount with four #4 x 1/2" sheet metal screws and #4 flat washers.



During speed run testing of early production P-47s, test pilots attained a level flight speed of over 400 mph.

INSTALL THE AIR RETRACT CONTROLS

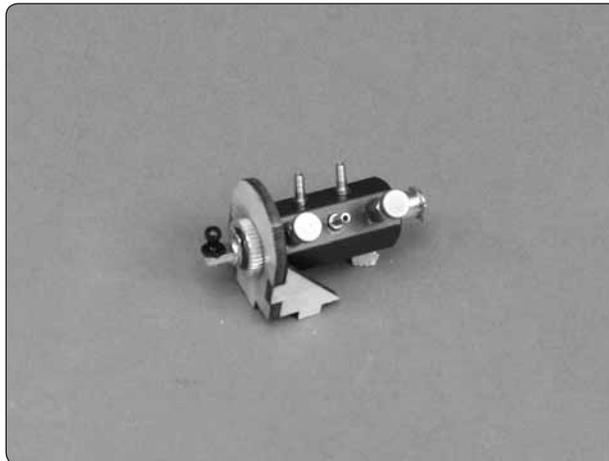
Pneumatic retracts only. Electrics skip to INSTALL THE TAIL GEAR COVER.



- ❑ 1. Test fit the retract servo tray in the fuselage. It should fit between the rudder and throttle servo. Drill

a 1/16" (1.6 mm) pilot hole in the servo tray using the four mounting holes in the retract servo tray as guides. Attach the retract servo tray with #2 x 3/8" (9.5 mm) sheet metal screws and #2 flat washers.

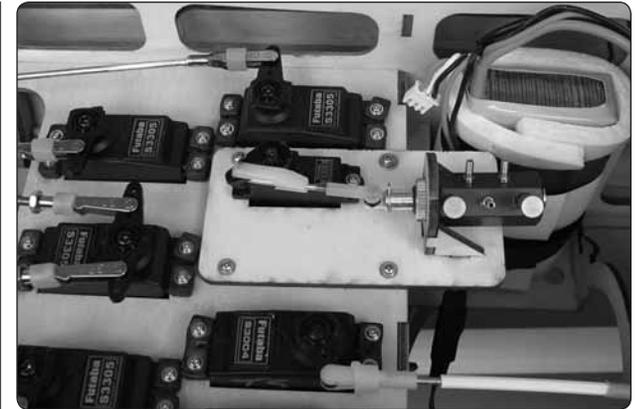
- ❑ 2. Install the retract control valve servo in the retract servo tray and plug it into the receiver.



- ❑ 3. Assemble the retract control valve mount and install the retract control valve. Install a .080 ball link ball and .080 nut on the valve. Be sure to use a drop of threadlocker on the threads of the ball link ball.



- ❑ 4. Glue the retract control valve mount on the retract servo tray.

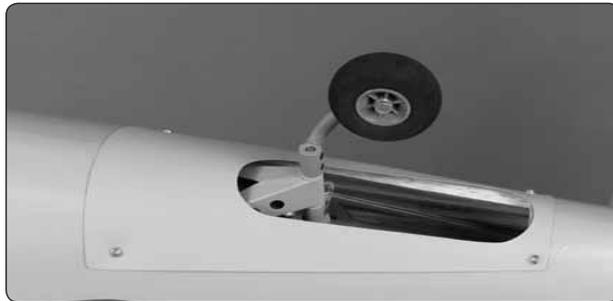
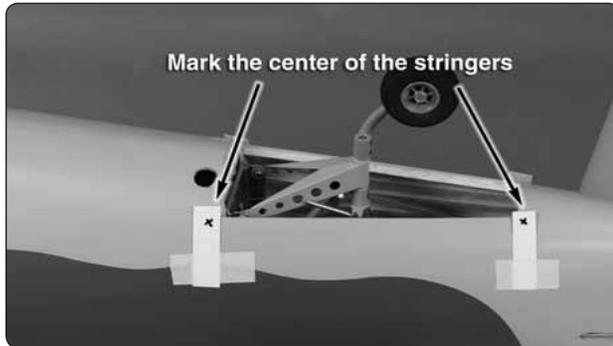


- ❑ 5. Cut off 1/2" (12.7 mm) from the threaded end of the 2-56 x 6" (152 mm) metal pushrod. Thread the nylon ball socket on the pushrod. Snap the ball socket onto the ball link ball on the retract control valve. Mark the pushrod where it crosses the servo arm and make a 90 degree bend at the mark. Install the pushrod in the servo arm and install a nylon Faslink. Cut the pushrod 1/8" (3 mm) past the top of the Faslink.

- ❑ 6. Install a fill valve in the fuselage side in a convenient location. Refer to the air retracts instructions. Connect the pressure tank, fill valve and control valve to a T-fitting. Connect the two air lines coming from the tail gear retract to separate T-fittings. Then, connect the T-fittings to the control valve. Finally connect the quick connects to the T-fittings. Make sure the quick connectors correspond to the quick connectors installed in the wing. Electrical tape or nylon tie wraps can be used to wrap the air lines together to clean up the installation.

INSTALL THE TAIL GEAR COVER

❑ 1. Operate the tail gear retract a couple of times, making any adjustments as needed. The opening for the tail gear may need to be widened slightly at the steering arm to prevent the steering arm from rubbing on the fuselage. Tape the fiberglass tail gear retract cover over the retract opening. Again, operate the retracts, checking that the tail gear retract does not hit the cover.

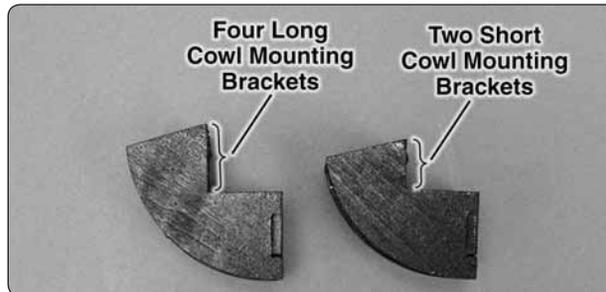


❑ 2. The tail gear retract cover can be permanently installed using CA glue or with screws. If CA glue is used it will be difficult to remove the cover and access the retracts if needed. To install the cover with screws, tape a piece of paper to the fuselage at each corner of the tail gear opening. Place a mark on the paper at the center of the stringer. Reposition the retract cover and tape it in place. Drill 1/16" [1.6mm] holes through the cover and the stringers at each mark. Remove the cover and enlarge the holes in the cover only with a 3/32" [2.4mm] drill bit. Attach the cover to the fuselage with #2 x 3/8" [9.5mm] sheet metal screws and #2 washers. Harden the screw holes with thin CA glue.

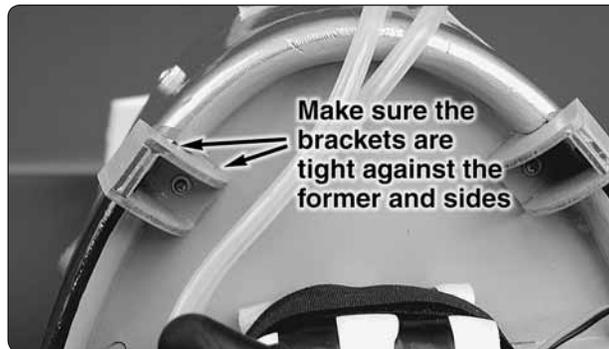


One might question the selection of an older technology, bulkier radial engine vs. a more modern and streamlined "V" engine for the P-47. A problem of "V" engines is their liquid cooling system (including a radiator) which is susceptible to gun fire. Before Glycol became available, liquid cooled engines also featured extremely large radiators adversely affecting aerodynamics. Early P-47 design team members were not willing to "put all their eggs in one basket" and utilized "V" engines for some of their other projects.

INSTALL THE COWL



❑ 1. Note that there are four long cowl mounting brackets and two short cowl mounting brackets.



❑ 2. Position the two short cowl mounting brackets in the two bottom slots in the front of the fuselage.

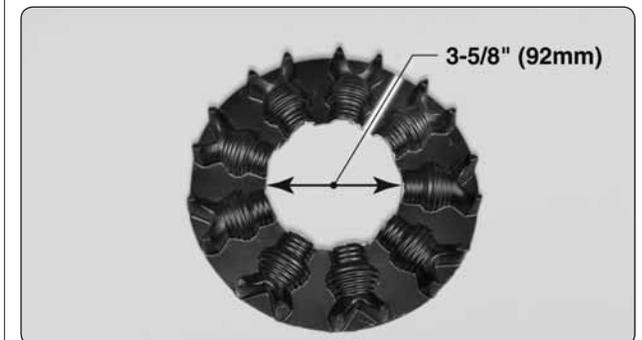
Drill a 1/16" [1.6mm] hole through the forward former using the hole in the cowl mounting bracket as a guide. Attach the cowl mounting bracket to the forward former using 6-minute epoxy, #2 x 3/8" [9.5mm] sheet metal screws and #2 flat washers.

❑ 3. Install the four long cowl mounting brackets in the remaining slots following the same procedure.



❑ 4. For installation with an electric motor, proceed to step 5. Cut out two openings between the cylinders and the center of the plastic radial engine. The center hole needs to be large enough to clear the drive washer of the gas engine. Proceed to step 10.

For installation with the RimFire 65cc electric motor.



❑ 5. The center hole in the radial engine will need to be enlarged to 3-5/8" (92 mm) to fit over the RimFire 65cc electric motor.



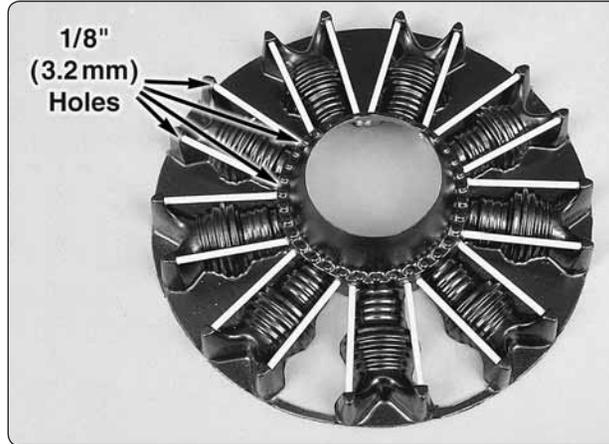
❑ 6. The plywood engine frame can be painted black. Use 6-minute epoxy to glue the plastic radial engine to the plywood engine frame. Align the radial engine with the embossed circle on the plywood frame.

❑ 7. Enlarge the hole in the plywood frame to match the center hole in the dummy radial engine.

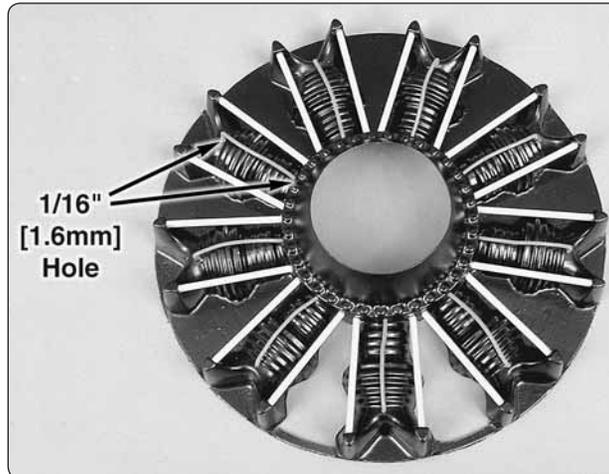


❑ 8. Place the assembly on a flat surface. Position one of the 7/8" x 12" (22 x 300 mm) plastic strips inside the hole and cut it to length. With the plastic strip against the flat surface, glue it to the plywood frame and the radial engine.

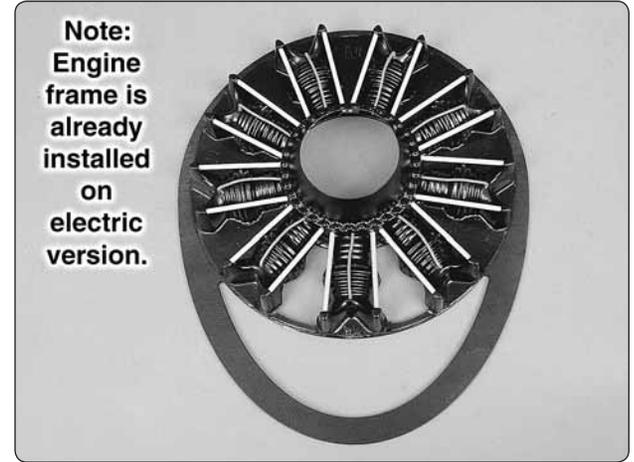
❑ 9. Glue the second plastic strip inside the first strip. Paint the strips black.



❑ 10. Drill 1/8" (3.2 mm) holes in the bottom of the rocker arms and in the crankcase as shown. Glue the eighteen aluminum tubes in the holes. Note that the aluminum tubes will need to be shortened if installed in the dummy engine used with the electric motor.



❑ 11. Drill 1/16" [1.6mm] holes in the front of the cylinder head. Glue the red sparkplug wire in the holes.

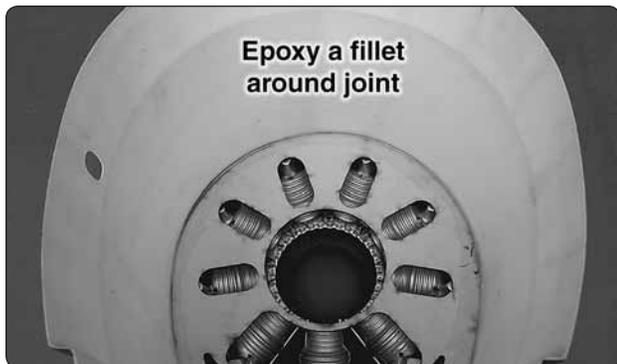


Note:
Engine frame is already installed on electric version.

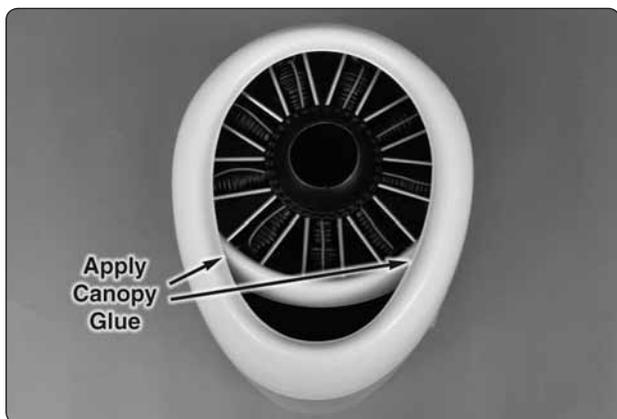
❑ 12. The plywood engine frame can be painted black. Use 6-minute epoxy to glue the plastic radial engine to the plywood engine frame. Align the radial engine with the embossed circle on the plywood frame.



❑ 13. Test fit the radial engine assembly in the cowl. Position it so it is centered and equal distance from the edge of the cowl. Mark the location on the inside of the cowl. This will help you reposition the engine once you have applied epoxy to the engine assembly. Use masking tape to hold the dummy engine in position and test fit the cowl on the fuselage.

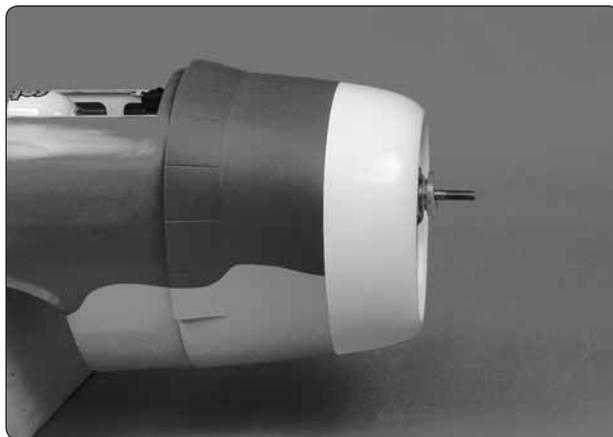


❑ 14. Before gluing, use sandpaper to roughen the gluing area inside the cowl. Clean the area with a paper towel dampened with denatured alcohol. Mix approximately 1/2 oz [14.7cc] of 30-minute epoxy. For a stronger joint, add some milled fiberglass to the epoxy. Apply epoxy to the edge of the engine assembly and insert it in the cowl. Use the remaining epoxy to create a fillet around the edge of the assembly.



❑ 15. Trim the white turbo charger/oil cooler intake around the base. Then mark and trim the top of the intake 3/8" [9.5mm] from the base. Trial fit the intake

in the cowl. It should fit over the rocker arm covers of the radial engine, against the inner lip of the cowl. Once satisfied with the fit, use medium sandpaper to roughen the end of the intake. Clean the sanding dust off with denatured alcohol and glue it to the cowl inside with CA. Use canopy glue to attach the front of the intake to the back of the cowl lip.



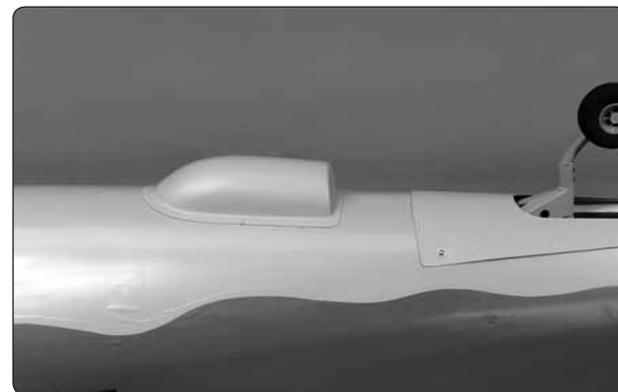
❑ 16. Test fit the cowl over the engine. Install the recommended propeller on the engine. Adjust the position of the cowl so that the dummy radial engine is centered on the drive washer and the propeller clears the front of the cowl by 1/8" [3.2mm]. The cowl mounting brackets should be approximately 1/8" [3.2mm] inside the edge of the cowl.

❑ 17. The six cowl mounting brackets can be seen from the rear of the cowl. Drill a 3/32" [2.4mm] pilot hole through the cowl and the center of the cowl mounting brackets. Enlarge the holes in the cowl to 1/8" [3.2mm]. Secure the cowl to the mounting brackets with #4 x 1/2" [12.7mm] sheet metal screws and #4 flat washers. Be sure to harden the screw holes with thin CA.

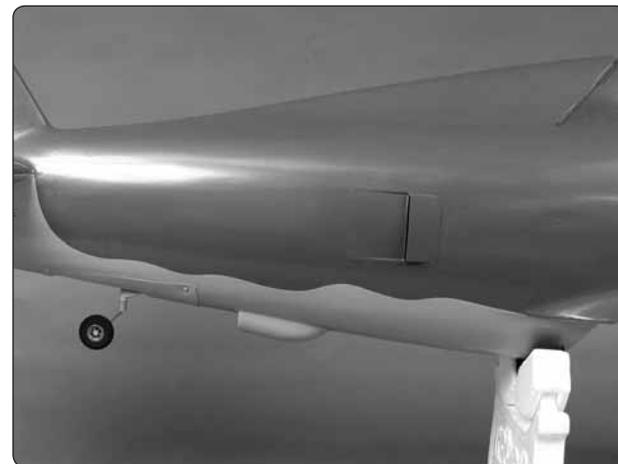
❑ 18. Mark the location of the muffler exhaust exit and the cooling air exit on the bottom of the cowl. Remove the cowl from the fuselage before cutting to prevent the fiberglass dust from entering the carburetor. Use a high speed rotary tool with a carbide cutting bit to cut the openings. Start with a small hole and slowly enlarge the openings while test fitting the cowl on the fuselage.

❑ 19. Route the vent fuel line from the fuel tank out the exhaust exit in the bottom of the cowl.

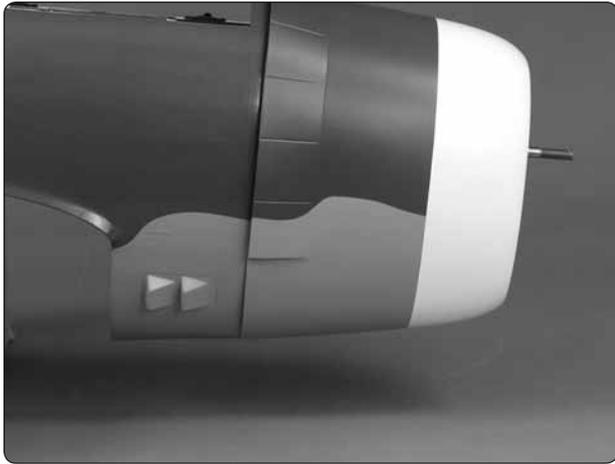
APPLY THE FINAL DETAILS



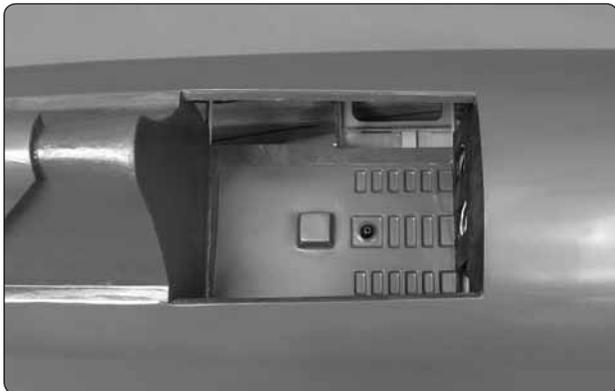
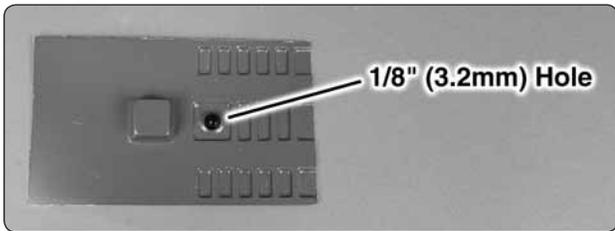
❑ 1. Position the turbocharger exhaust fairing as shown. Mark on the fuselage the outline of the fairing. Inside the outline use a T-pin to prick small holes in the covering, or trim and remove the covering from inside the outline. This will help the glue hold the fairing on. Glue the turbocharger exhaust fairing on the fuselage with canopy glue or medium CA.



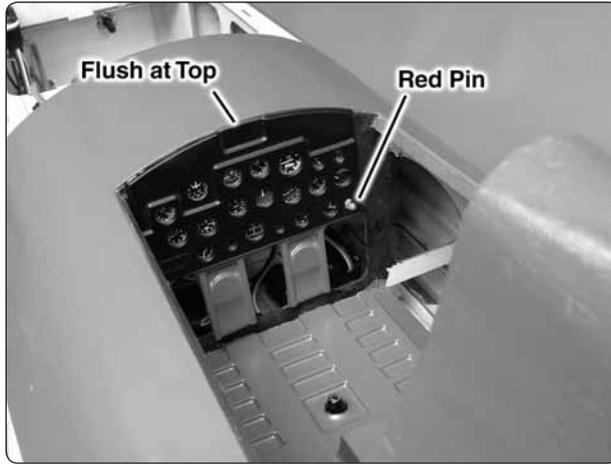
❑ 2. Glue the two innercooler exhaust doors in the two cutouts in the aft end of the fuselage.



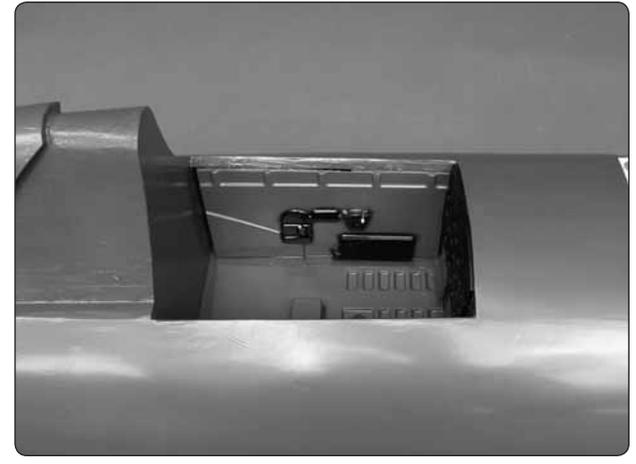
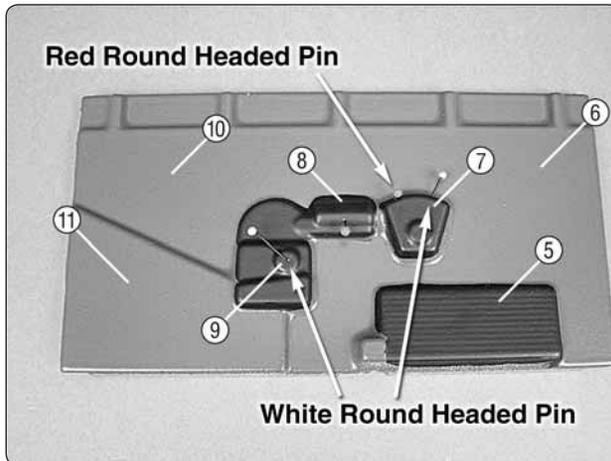
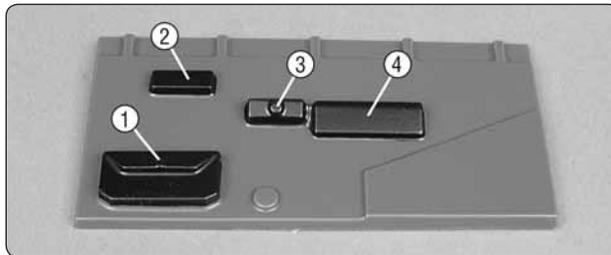
❑ 3. Glue the two oil cooler louvers to the forward lower fuselage following the same procedure used to install the turbocharger exhaust fairing.



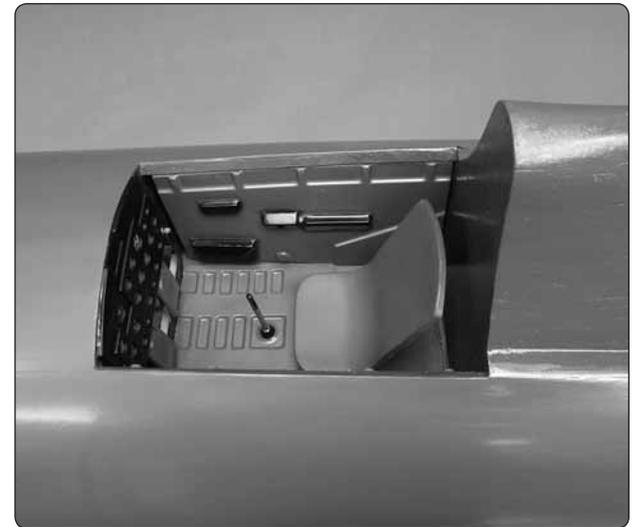
❑ 4. Trim the cockpit floor along the edge so that it lays flat. Use medium CA to glue the floor in the bottom of the cockpit. The floor should be positioned as far forward as possible. Drill a 1/8" (3.2mm) hole through the control stick boot.



❑ 5. Insert one of the red round headed pins in the lower right corner of the instrument panel to represent a knob. Glue the instrument panel in the front of the cockpit so that the top of the instrument panel is flush with the top of the fuselage. Canopy glue or thick CA works well for attaching the instrument panel.



❑ 6. Trim the sides of the cockpit leaving approximately 1/16" [1.6mm] lip around the edges. Apply the decals to the numbered locations on the side cockpit panels. Install the white and red round head pins and decals as shown. The top edge of the cockpit sides should fit under the stringer at the top of the cockpit.



❑ 7. Trim the seat along the cutout lines and glue it to the pedestal on the cockpit floor. Now glue the control stick in the previously drilled hole using the height of the seat as a guide.

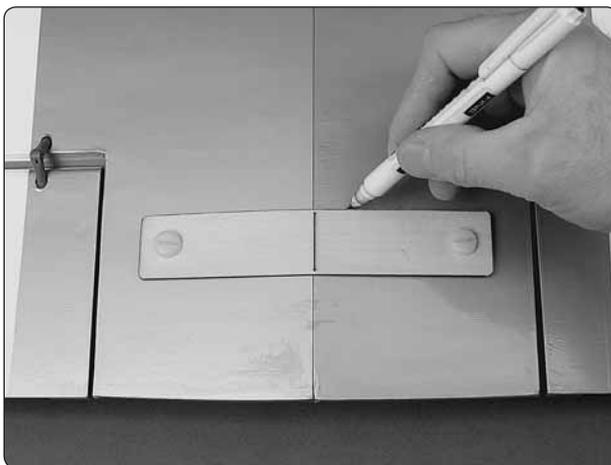
FINISH THE WING



❑ 8. Now is the time to securely install a pilot before gluing the canopy on. The pilot used is from Best Pilots. Wash the canopy in warm water, and then, dry it off. Place the canopy on the fuselage. Be certain it is centered from side-to-side and mark the outline on the fuselage. As before, prick holes in the covering just inside the outline. Use canopy glue to attach the canopy on the fuselage.



❑ 9. Insert the antenna mast in the top of the fuselage. The mast is held in place with magnets.



❑ 1. Place the wing bolt plate on the bottom of the wing and insert the 1/4-20 x 2" [51mm] nylon wing bolts through the wing bolt plate and the wing. Mark the outline of the wing bolt plate onto the bottom of the wing.

❑ 2. Carefully cut the covering with a sharp hobby knife, using the outline as a guide. Be careful not to cut into the balsa. Peel the covering from the wing. Glue the wing bolt plate to the wing with 6-minute epoxy, using the wing bolts and masking tape to hold it down.

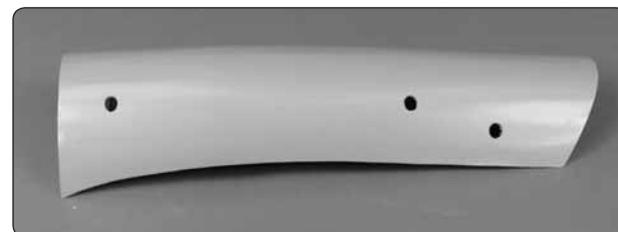
Perform steps 3, 4, and 5 if the optional drop tank will not be installed.

❑ 3. Mount the wing on the fuselage. Position the belly pan on the wing so that it is evenly spaced between the fuselage. Mark the outline of the belly pan on the bottom of the wing. Cut and remove a 1/2" [12.7mm] wide strip of covering, 1/32" [0.8mm] from inside the outline.

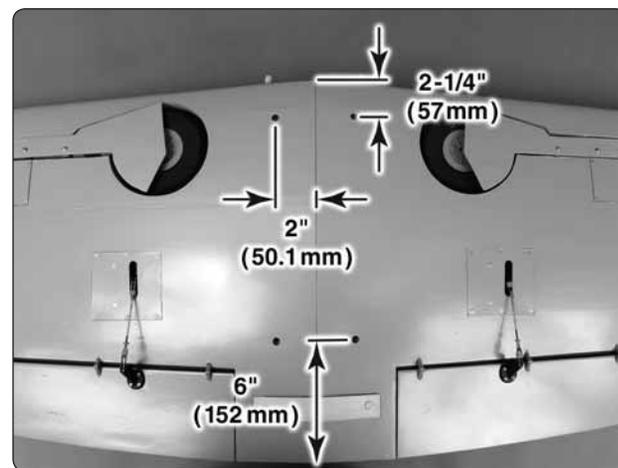
❑ 4. Remove the wing and place waxed paper between the wing and the fuselage at the leading and trailing edge. This will prevent the wing from becoming glued to the fuselage if the epoxy should run out of the joint. Reinstall the wing.



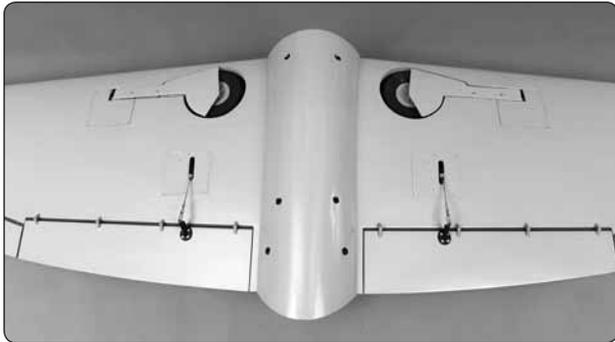
❑ 5. Glue the belly pan to the wing using 30-minute epoxy. Make sure that the belly pan is tight against the bottom of the wing and centered between the fuselage. Wipe off any excess epoxy before it cures.



❑ 6. If you will be installing the drop tank, trim the covering from over the four bolt openings on the belly pan.



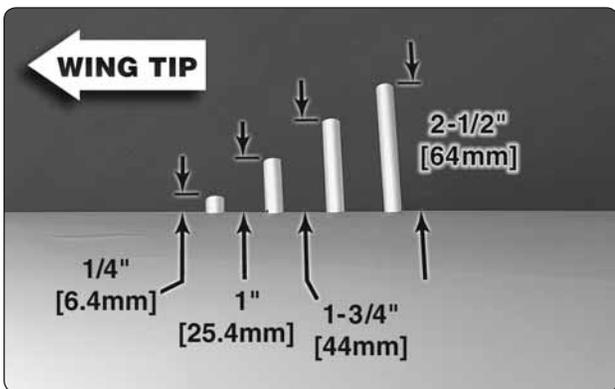
❑ 7. Trim the covering from over the four corresponding holes in the bottom of the wing.



❑ 8. Test fit the belly pan on the wing attaching it with four 1/4"- 20 x 2" (51 mm) nylon wing bolts.



❑ 9. Test fit the wing on the fuselage and make any adjustments required to get a good fit between the wing and fuselage. This may require some sanding of the wing dowel holes in the front of the fuselage.



❑ 10. Clean the aluminum tubes with denatured alcohol and glue the gun barrels in the wing with

6-minute epoxy. Note the distance from the leading edge of the wing to the end of each gun barrel.



The "belly pan" under the wing conceals the air ducting for the supercharger. One duct carries air from the intake in the front of the cowl back to the supercharger (driven by the turbine) and two smaller ducts carry exhaust gasses from the engine to the turbine.

APPLY THE DECALS

❑ 1. The large decals come die cut. Where possible, round the corners so they won't catch and lift while cleaning and handling the model.

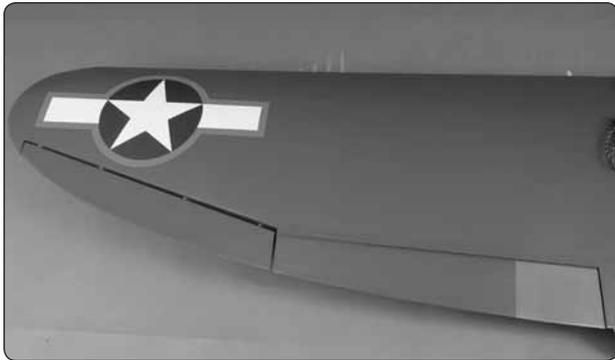
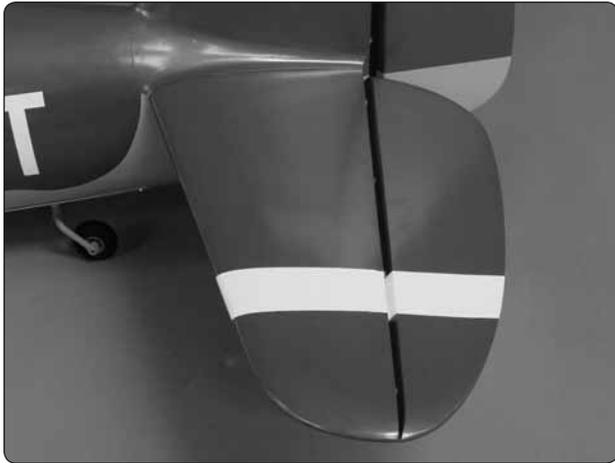
❑ 2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water—about 1/2 teaspoon [2.5cc] of soap per gallon of water. Submerge one of the decals in the solution and peel off the paper backing. **Note:** Even though the decals have a "sticky-back" and are not the water transfer type, submersing them in soap & water allows accurate positioning and reduces air bubbles underneath.

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

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

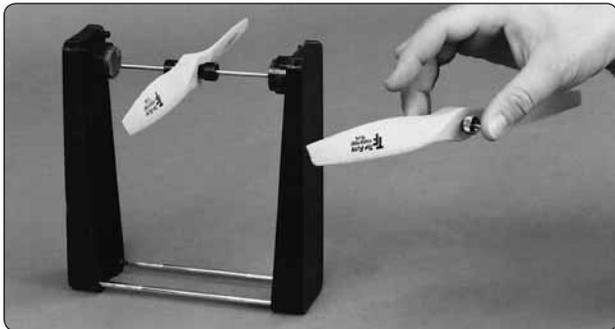
Please use the following pictures as a guide for decal placement.





GET THE MODEL READY TO FLY

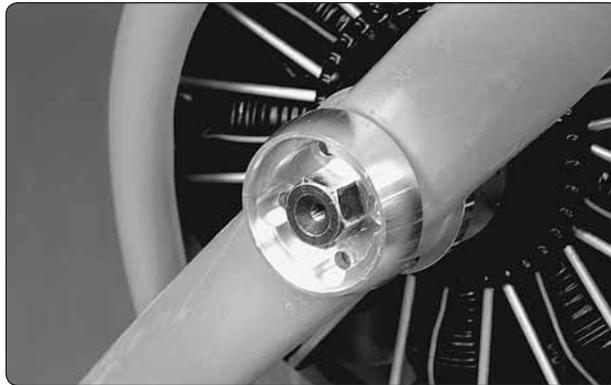
INSTALL THE PROPELLER



❑ 1. Carefully balance the propeller and any spare propellers. An unbalanced propeller can be the single most significant cause of vibration that can damage

the model. Not only will engine mounting bolts loosen, possibly with disastrous effect, but vibration may also damage the receiver and receiver batteries. Vibration can also cause the fuel to foam, which will, in turn, cause the engine to run hot and 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.



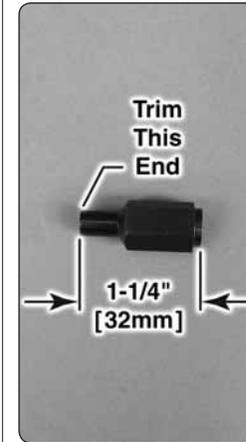
(Gas Engine)

❑ 2. The included aluminum prop hub was designed to be used with the DLE-55, DLE-61 and the O.S. GT 60 gas engines. Bolt the include prop hub in front of the propeller in place of the prop washer.



❑ 3. Install the prop hub cone on the engine using a M5 x 50mm socket head cap screw. Use a drop of threadlocker on the threads.

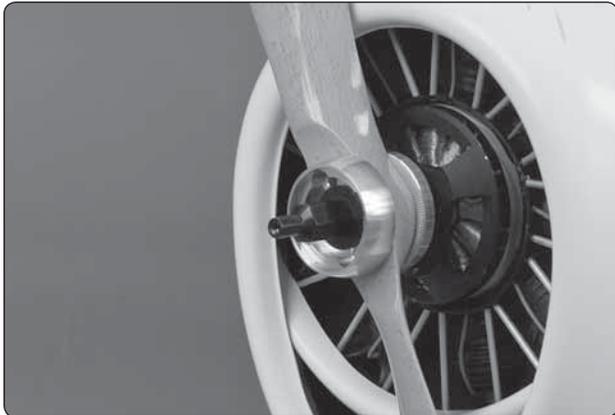
(Electric Motor)



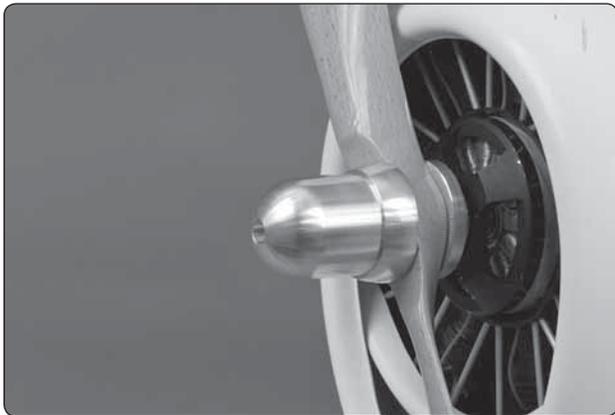
❑ 4. **APC Electric Propeller:** Enlarge the propeller shaft hole to 10mm using a metric prop reamer or a size 'X' drill bit. Trim 1/4" [5 mm] from the end of the spinner adapter (GPMQ4590 not included) so that the adapter is 1-1/4" [32 mm] long. Install the propeller on the motor shaft and secure it with the spinner adapter and washer.



❑ 5. Secure the spinner cone to the spinner adapter with a 10-32 x 1" socket head cap screw (not included).



❑ 6. **Xoar Electric Propeller:** Enlarge the propeller shaft hole to 10mm using a metric prop reamer or a size 'X' drill bit. Secure the propeller and spinner base with the spinner adapter and washer (GPMQ4590) (not included).



❑ 7. Secure the spinner cone to the spinner adapter with a 10-32 x 1" socket head cap screw (not included).

WARNING: NEVER connect the motor battery to the ESC until you are ready to fly. Once the motor battery is connected the motor could start unexpectedly at any time causing serious injury.

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.

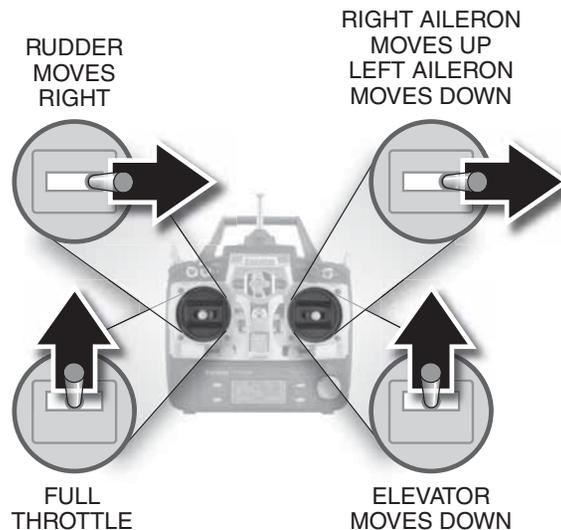
❑ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

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.

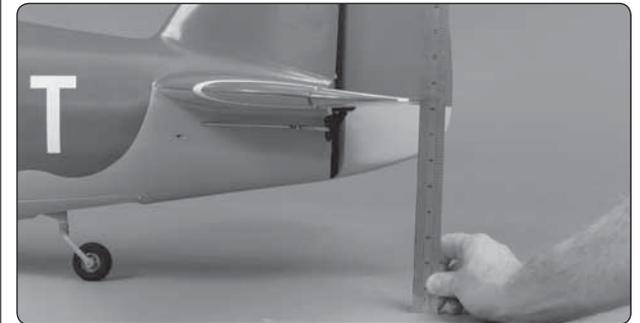
4-CHANNEL RADIO SETUP (STANDARD MODE 2)



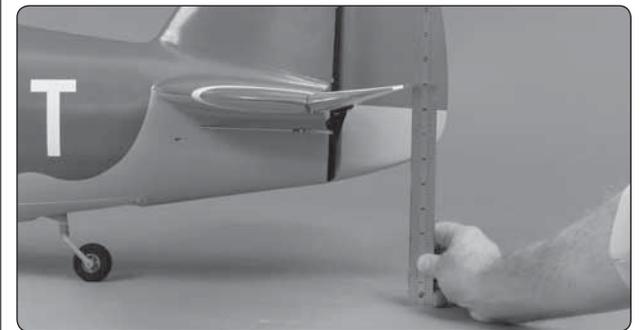
❑ 3. Make certain that the control surfaces and the carburetor respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces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

SET THE CONTROL THROWS

To ensure a successful first flight, set up your Giant P-47 Razorback ARF according to the control throws specified in this manual. The throws have been determined through actual flight testing and accurate record-keeping, allowing the model to perform in the manner in which it was intended. If, after you have become accustomed to the way the Giant P-47 Razorback ARF flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model too responsive and difficult to control, so remember, "more is not always better."



❑ 1. Use a box or something similar to prop up the bottom of the fuselage so the horizontal stabilizer and wing will be level. Hold a ruler vertically on your workbench against the widest part (front to back) of the trailing edge of the elevator. Note the measurement on the ruler.



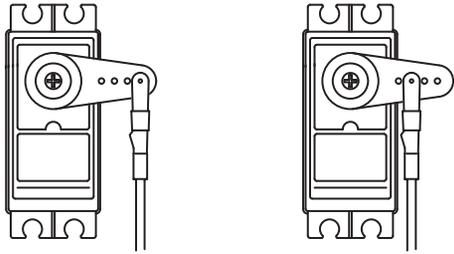
❑ 2. Measure the high rate elevator throw first. Move the elevator up with your transmitter and move the

ruler forward so it will remain contacting the trailing edge. The distance the elevator moves up from center is the “up” elevator throw. Measure the down elevator throw the same way.

At the Servos

The pushrod farther out means **More Throw**

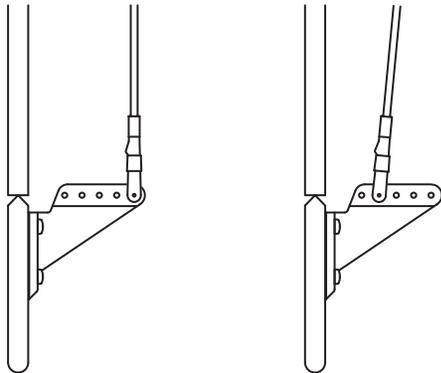
The pushrod closer in means **Less Throw**



At the Control Surfaces

The pushrod farther out means **Less Throw**

The pushrod closer in means **More Throw**



❑ 3. If necessary, first adjust the location of the pushrod on the servo arm or on the elevator horn. Once the throws are close, program the servo end points in your transmitter to fine tune the throws according to the measurements in the control throws chart.

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

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

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

These are the recommended control surface throws:				
	HIGH RATE		LOW RATE	
ELEVATOR	Up	Down	Up	Down
	3/4" [19.1mm]	3/4" [19.1mm]	1/2" [12.7mm]	1/2" [12.7mm]
RUDDER	Right	Left	Right	Left
	1-7/8" [47mm]	1-7/8" [47mm]	1-3/8" [35mm]	1-3/8" [35mm]
AILERONS	Up	Down	Up	Down
	3/4" [19.1mm]	3/4" [19.1mm]	1/2" [12.7mm]	1/2" [12.7mm]
FLAPS	Down			
	2-3/8" [60mm]		34°	

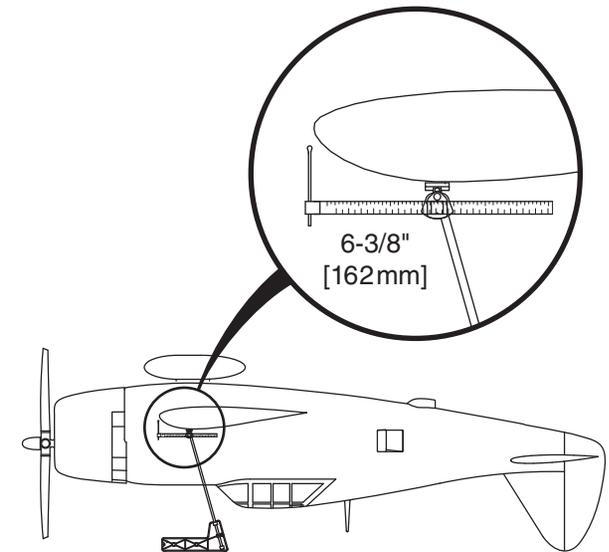
Once the throws are set, apply a drop of threadlocker to the threads on the pushrod and tighten the nuts against the clevises.

IMPORTANT! With the throws set, now is a good time to set the failsafe on the transmitter. The failsafe may save your plane if the signal is lost.

BALANCE THE MODEL (C.G.)

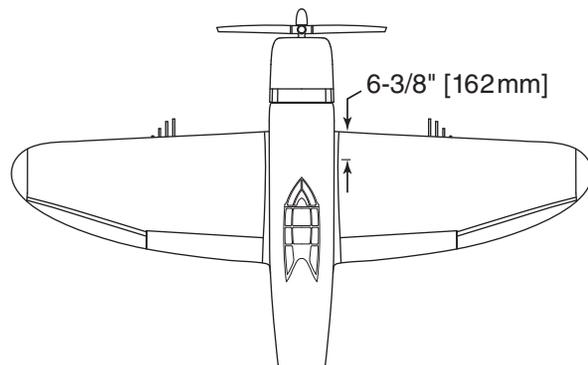
More than any other factor, the C.G. (center of gravity/balance point) can have the greatest effect on how a model flies and could determine whether or not your first flight will be successful. If you value your model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.**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

At this stage the model should be in ready-to-fly condition with **all** of the components in place including the complete radio system, engine, muffler, propeller, spinner and pilot. The fuel tank should be empty. If electric, the motor battery installed, but not connected to the ESC.



❑ 1. If using a Great Planes C.G. Machine, set the rulers to 6-3/8" [162mm]. If not using a C.G. Machine, use a fine-point felt tip pen to mark lines on the top of the wing on both sides of the fuselage 6-3/8" [162mm] back from the leading edge. Apply narrow (1/16" [2mm]) strips of tape over the lines so you will be able to feel them when lifting the model with your fingers.

This is where your model should balance for the first flights. Later, you may experiment by shifting the C.G. 1/4" [6.4mm] forward or 1/4" [6.4mm] back to change the flying characteristics. Moving the C.G. forward will improve the smoothness and stability, but the model will then be less aerobatic (which may be fine for less-experienced pilots). Moving the C.G. aft makes the model more maneuverable and aerobatic for experienced pilots. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



2. With the wing attached to the fuselage, 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." If the nose drops, the model is "nose heavy." For a tail heavy model the receiver battery pack can be moved aft. For a nose heavy model use Great Planes "stick-on" lead (GPMQ4485). To find out how much weight is required, place incrementally increasing amounts of weight on the bottom of the fuselage over the location where it would be mounted inside until the model balances. A good place to add stick-on nose weight is to the firewall. Do not attach weight to the cowl—this will cause the mounting screws to open up the holes in the cowl. 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.

If mounting weight where it may be exposed to fuel or exhaust, do not rely upon the adhesive on the back to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive and cause the weight to fall off. Instead, permanently attach the weight with glue or screws.

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

CHECK LIST

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

1. Fuelproof all areas exposed to fuel or exhaust residue such as the cowl ring, wing saddle area, etc.

2. Check the C.G. according to the measurements provided in the manual.

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

4. If using a 72 MHz receiver, 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.

5. Balance your model *laterally* as explained in the instructions.

6. 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), engine bolts, etc.

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

8. Make sure all hinges are **securely** glued in place.

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

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

11. 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.

12. 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.

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

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 cone.

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.



The final variant of the P-47 was the P-47N-25 rolling off the Republic Farmingdale production line in 1945. The “N” featured squared-off clipped wing tips and an increased wingspan to accommodate four additional 50-gallon internal wing tanks. The goal of increasing range to fulfill the roll of bomber escort (and to become more competitive with the P-51 Mustang) was accomplished.

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 36 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.

GROUND CHECK AND RANGE CHECK

Run the engine for a few minutes to make sure it idles reliably, transitions smoothly and maintains full power indefinitely. Afterward, shut the engine off and inspect the model closely, making sure all fasteners, pushrods and connections have remained tight and the hinges are secure. Always ground check the operational range of your radio before the first flight of the day following the manufacturer’s instructions that came with your radio. This should be done once with the engine off and once with the engine running at various speeds. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver 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, scarfs, 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. If you do flip the prop with your hand, protect it with a thick glove such as a welder’s glove.

Make all engine adjustments from behind the rotating propeller.

The engine or motor 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 gasoline powered engine an on/off switch should be connected to the engine ignition. Do not throw anything into the propeller of a running engine.

MOTOR SAFETY PRECAUTIONS

ALWAYS remove the propeller if the motor batteries will be connected while working on the plane.

ALWAYS follow the charging instructions included with your charger for charging LiPo batteries. LiPo batteries can cause serious damage if misused.

WARNING: Once the motor batteries are connected the electric motor can start at any time. Make sure the fail safe is set on your radio to prevent the motor from starting if the signal is lost.

ALWAYS unplug the motor batteries first.

NEVER switch off the transmitter with the motor batteries plugged in.

WARNING: Read the entire instruction sheet included with your motor batteries. Failure to follow the 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 to charge a LiPo battery.

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 unless the battery is rated for a higher charge rate.

ALWAYS set the charger’s output volts to match the battery volts.

ALWAYS charge a LiPo battery in a fireproof location.

NEVER trickle charge a LiPo battery.

NEVER allow the battery temperature to exceed 150 degrees F (65 degrees C).

NEVER disassemble or modify the pack wiring in any way or puncture the cells.

NEVER discharge LiPo batteries below 2.7V per cell.

NEVER place the battery or charger on combustible materials or leave it unattended during charge or discharge.

ALWAYS KEEP OUT OF THE REACH OF CHILDREN.

NEVER charge the battery in the plane.

ALWAYS remove the battery from the plane after a crash. Set it aside in a safe location for at least 20 minutes. If the battery is damaged in the crash it could catch fire.

If the battery starts to swell, quickly move the battery to a safe location, preferably outside. Place it in a bucket, covering the battery with sand. Never use water to try and put out a LiPo fire.

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.**

Since the Giant P-47 Razorback ARF qualifies as a "giant scale" model and is therefore eligible to fly in IMAA events, we've printed excerpts from the IMAA Safety Code which follows.

FLYING

The Giant P-47 Razorback ARF is a great-flying model that flies smoothly and predictably. The Giant P-47 Razorback 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.

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

If you are using the optional air retracts, remember to pump them up before each flight. 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 wheel on the ground. If necessary, adjust the tail wheel so the model will roll straight down the runway. If you need to calm your nerves before the maiden flight, shut the engine down and bring the model back into the pits. Top off the fuel, then check all fasteners and control linkages for peace of mind.

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 to maintain tail wheel steering, 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 Giant P-47 Razorback 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 and lowering the flaps 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

One of the keys to landing a giant-scale model is to maintain sufficient airspeed throughout the landing approach. An unusually high airspeed is not necessary, but those unfamiliar with landing giant-scale models are sometimes deceived by the model's larger size. Larger models often appear to be closer than they actually are.

Additionally, most giant-scale models slow down rapidly, thus causing the uninitiated to land short. To avoid this initial illusion, make your landing pattern closer than you normally might for a .40-size sport model. Also, don't pull the throttle all the way back and leave it there the way you normally would. Instead, momentarily pull the throttle all the way back, but then advance it a "click" or two to keep the engine RPM up and maintain airspeed. Once over the runway you can cut the throttle the rest of the way and the model will slow for the landing flare.

The Giant P-47 Razorback ARF may be landed with or without flaps. Flaps increase lift and drag, so the plane may be landed slower, thus reducing rollout after touchdown (not as much of a factor on grass runways). To initiate a landing approach, reduce the throttle while on the downwind leg. If using flaps, allow the model to slow before extending them. 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. If using flaps, keep a few additional "clicks" of power so the model doesn't slow too much. 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 retract the flaps when enough airspeed is gained. Climb out to make another attempt. When 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.

Note: If ever the occasion arises when a dead-stick landing must be performed, do not extend the flaps until **certain** the model will be able to reach the landing zone (on dead-stick landings it is common to land with no flaps at all). Without engine power, flaps can unexpectedly reduce the model's range, thus causing you to come up short of the field.

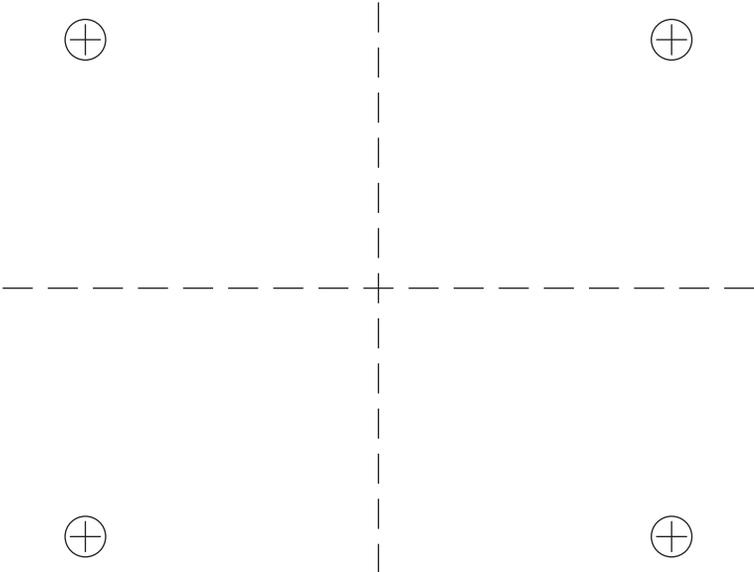
One final note about flying your Giant P-47 Razorback ARF. Have a goal or flight plan in mind for **every** flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily 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!

O.S. GT60 MOUNTING HOLES

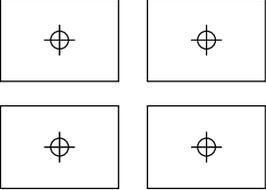


I.D. TAG

This model belongs to:

Name
Address
City, State, Zip
Phone Number
AMA Number

GEAR DOOR DRILL GUIDE



See templates on reverse side.



