Dirty Birdy

DIRTY BIRDY .60 ARF INSTRUCTION MANUAL

SPECIFICATIONS

Wingspan: 64.5 in [1640 mm]
Wing Area: 690 in^2 [44.5 dm^2]
Wing Loading: 25–28 oz/ft^2 [76–85 g/dm^2]
Length: 56 in [1420 mm]
Weight: 7.5–8.5 lb [3400–3850 g]
Radio: 4-channel minimum with 5-7 servos and standard size receiver
Engine: .60–.65 cu in [10–10.5 cc] two-stroke

WARRANTY

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

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

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

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

Hobby Services
3002 N. Apollo Dr. Suite 1
Champaign IL 61822 USA

Include a letter stating your name, return shipping address, as much contact information as possible (daytime telephone number, fax number, e-mail address), a detailed description of the problem and a photocopy of the purchase receipt. Upon receipt of the package the problem will be evaluated as quickly as possible.

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

GREAT PLANES® MODEL MANUFACTURING COMPANY

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

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INTRODUCTION

Congratulations on your purchase of the Dirty Birdy .60 ARF! For 35 years Joe Bridi's design has been known for its capabilities of precision pattern flying and was revolutionary at the time of its introduction. Great Planes offered a fiberglass kit version of the Dirty Birdy in the 1980's, and now it has finally been revived as a fiberglass ARF. Accommodations for mechanical retracts, pneumatic retracts, and a tuned pipe are provided for drop-in installation. Fixed landing gear is provided in the box for those budget-minded modelers as well. With pre-hinged control surfaces and stab halves that mount onto two carbon tubes, assembly couldn't be easier. If you were one of the first to build this fantastic plane in 1975 and want to relive the experience, or this is your very first pattern ship, you have made the right choice as the Dirty Birdy will surely deliver the performance you expect.

For the latest technical updates or manual corrections to the Great Planes Dirty Birdy .60 ARF visit the Great Planes web site at www.greatplanes.com. Open the "Airplanes" link, then select the Dirt Birdy .60 ARF. If there is new technical information or changes to this model a "tech notice" box will appear in the upper left corner of the page.

Academy of Model Aeronautics

We urge you to join the AMA (Academy of Model Aeronautics) and a local R/C club. The AMA is the governing body of model aviation and membership is required to fly at AMA clubs. Though joining the AMA provides many benefits, one of the primary reasons to join is liability protection. Coverage is not limited to flying at contests or on the club field. It even applies to flying at public demonstrations and air shows. Failure to comply with the Safety Code (excerpts printed in the back of the manual) may endanger insurance coverage. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. There are over 2,500 AMA chartered clubs across the country. Contact the AMA at the address or toll-free phone number below:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302-9252

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

AMA SINCE 1936

Or via the Internet at: http://www.modelaircraft.org

IMPORTANT!!! Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.

SAFETY PRECAUTIONS

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

1. Your Dirty Birdy .60 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 Dirty Birdy, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.

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

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

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

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

6. You must check the operation of the model before **every** flight to ensure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.

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

8. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if an engine larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

9. **WARNING:** The fuselage and cowl 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 Dirty Birdy ARF that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

Radio Equipment

The Dirty Birdy requires a minimum 4-channel radio system with a minimum of five 44 oz.-in. [3.2 kg-cm] standard sized servos. If you are installing mechanical retracts, two retract servos are also required. If you are installing pneumatic retracts, one additional standard servo is required.

In addition, two 12" [305mm] servo extensions are required for the aileron servos. If you are using a radio system that does not support mixing functions, a Y-harness will also be required to connect the aileron servos to the receiver. If you plan to connect the aileron servos to separate channels, you will also need two 6" [152mm] servo extensions to connect directly to the receiver to provide easy access when mounting the wing (these are not needed if you will be using the Y-harness).

Another Y-harness will also be needed if you are installing mechanical retracts. There is no advantage in connecting the retract servos to separate channels because you cannot alter the endpoints or travel volume.

Recommended part numbers for the radio components are provided below:

- ❍ Futaba® S3004 Standard Ball Bearing Servo (FUTM0004)
- ❍ Hobbico® CS-63 Servo Low Profile Retract BB U (HCAM1060)
- ❍ Hobbico 12" Extension Futaba J (HCAM2100)
- ❍ Futaba Dual Servo Extension 6" J (FUTM4130)
- ❍ Ernst Charge Receptacle Futaba J FM (ERNM3001)
- ❍ Hobbico HydriMax™ 4C 4.8V 2000mAh NiMH Square AA Rx U (HCAM6322)

Engine Recommendations

The recommended engine/motor size for the Dirty Birdy is a .60–.65 cu in [10–10.5cc] two-stroke engine. Choose a propeller based on the engine manufacturer's recommendation. The order number for the recommended engine is provided below:

- ❍ O.S.® 65AX ABL w/Muffler (OSMG0558)

Optional Tuned Pipes

The following parts are recommended for an optional tuned pipe system for the O.S. .65AX engine:

- ❍ .60–.75 cu in Quiet Tuned Pipe 1060 (MACG1060)
- ❍ Macs Long Tuned Pipe Adapter O.S. .61 SF/FX/FP (MACG2861)
- ❍ Macs Tuned Pipe Mount (MACG9231)

Optional Retracts

The Dirty Birdy is designed to accept both mechanical and pneumatic retracts. If you plan to use mechanical retracts you only need to purchase the mechanical retract set:

- ❍ Hobbico Mechanical Retracts 3-Gear (HCAP4000)

If you plan to install pneumatic retracts, you will need to purchase the following items:

- ❍ Robart 90 Degree Nose 5/32" Wire (ROBQ1807)
- ❍ Robart 90 Degree Mains w/3/16" Wire (ROBQ0005)
- ❍ Robart Standard Deluxe Air Control Kit (ROBQ2307)
- ❍ Great Planes Wire Axle 2x3/16" (2) (GPMQ4282)
- ❍ Great Planes Plated Wheel Collars 3/16" (4) (GPMQ4308)

ADDITIONAL ITEMS REQUIRED

Required Hardware & Accessories

This is the list of hardware and accessories required to finish the Dirty Birdy. Order numbers are provided in parentheses:

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

Adhesives and Building Supplies

This is the list of Adhesives and Building Supplies that are required to finish the Dirty Birdy:

- ❍ 1/2 oz. [15g] Thin Pro™ CA (GPMR6001)
- ❍ Pro 30-minute epoxy (GPMR6047)
- ❍ Threadlocker thread locking cement (GPMR6060)
- ❍ Denatured alcohol (for epoxy clean up)
- ❍ Drill bits: 1/16" [1.6mm], 5/64" [2mm], 3/32" [2.4mm], (**13/64" [5.2mm] pneumatic retracts only)**
- ❍ Great Planes Tap & Drill Set 6-32 (GPMR8102)
- ❍ Tap handle (GPMR8120)
- ❍ Rotary tool with cutting bit
- ❍ Revell® Premium Soft Handle Knife w/Blades (5) (RMXR6900)
- ❍ Top Flite® MonoKote® sealing iron (TOPR2100)
- ❍ Top Flite Hot Sock™ iron cover (TOPR2175)
- ❍ Panel Line Pen (TOPQ2510)
- ❍ Hobbico Steel T-Pins 1" (100) (HCAR5100)
- ❍ Harry Higley's 3/16" Extended Drill (HIGR1020)
- ❍ Small clamps
- ❍ Masking tape
- ❍ Household oil

Optional Supplies and Tools

Here is a list of optional tools that will help you build the Dirty Birdy .60 ARF:

- ❍ 1/2 oz. [15g] Thick Pro CA- (GPMR6013)
- ❍ 1/2 oz. [15g] Medium Pro CA+ (GPMR6007)
- ❍ Great Planes Pro Foam Safe CA- Thick Glue 20g (GPMR6072)
- ❍ 2 oz. [57g] spray CA activator (GPMR6035)
- ❍ 4 oz. [113g] aerosol CA activator (GPMR6034)
- ❍ CA applicator tips (HCAR3780)
- ❍ CA debonder (GPMR6039)
- ❍ Great Planes Pro Epoxy 6-Minute Formula 4 oz (GPMR6042)
- ❍ Epoxy brushes 6, (GPMR8060)
- ❍ Mixing sticks (GPMR8055)
- ❍ Mixing cups (GPMR8056)
- ❍ Pliers with wire cutter (HCAR0630)
- ❍ T.A. Emerald Performance Duster Compressed Air (TAEC1060)
- ❍ Servo horn drill (HCAR0698)
- ❍ Hobby Heat™ Micro Torch II (HCAR0755)
- ❍ Dead Center™ Engine Mount Hole Locator (GPMR8130)
- ❍ DuraTrax® Ultimate Body Reamer (DTXR1157)
- ❍ Precision Magnetic Prop Balancer (TOPQ5700)
- ❍ AccuThrow™ Deflection Gauge (GPMR2405)
- ❍ CG Machine™ (GPMR2400)
- ❍ Hobbico Flexible 18" Ruler Stainless Steel (HCAR0460)
- ❍ Top Flite MonoKote trim seal iron (TOPR2200)
- ❍ Top Flite MonoKote heat gun (TOPR2000)
- ❍ Hobbico Pin Vise 1/16 Collet w/6 Bits (HCAR0696)
- ❍ Hobbico 8-Piece Ball Tip Hex L Wrench SAE (HCAR0520)
- ❍ Hobbico 7-Piece Ball Tip Hex L Wrench Metric (HCAR0521)
- ❍ Great Planes Clevis Installation Tool (GPMR8030)

Building Stand

A building stand or cradle comes in handy during the build. We use the Robart Super Stand II (ROBP1402) for all our projects in R&D, and it can be seen in pictures throughout this manual.

IMPORTANT BUILDING NOTES

- When you see the term ***test fit*** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or *custom fit* the part as necessary for the best fit.
- Whenever the term ***glue*** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will make a recommendation.
- Whenever just ***epoxy*** is specified you may use ***either*** 30-minute (or 45-minute) epoxy ***or*** 6-minute epoxy. When 30-minute epoxy is specified it is **highly** recommended that you use only 30-minute (or 45-minute) epoxy, because you will need the working time and/or the additional strength.
- **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.
- The stabilizer and wing incidences and engine thrust angles have been factory-built into this model. However, some technically-minded modelers may wish to check these measurements anyway. To view this information visit the web site at www.greatplanes.com and click on "Technical Data." Due to manufacturing tolerances which will have little or no effect on the way your model will fly, please expect slight deviations between your model and the published values.

KIT INSPECTION

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

Great Planes Product Support
3002 N Apollo Drive, Suite 1 Ph: (217) 398-8970, ext. 5
Champaign, IL 61822 Fax: (217) 398-7721
E-mail: airsupport@greatplanes.com

ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes Dirty Birdy ARF are available using the order numbers in the **Replacement Parts List** that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company.

To locate a hobby dealer, visit the Great Planes web site at www.greatplanes.com. Select "Where to Buy" in the menu across the top of the page and follow the instructions provided to locate a U.S., Canadian or International dealer.

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

Mail parts orders and payments by personal check to:
Hobby Services
3002 N Apollo Drive, Suite 1
Champaign IL 61822

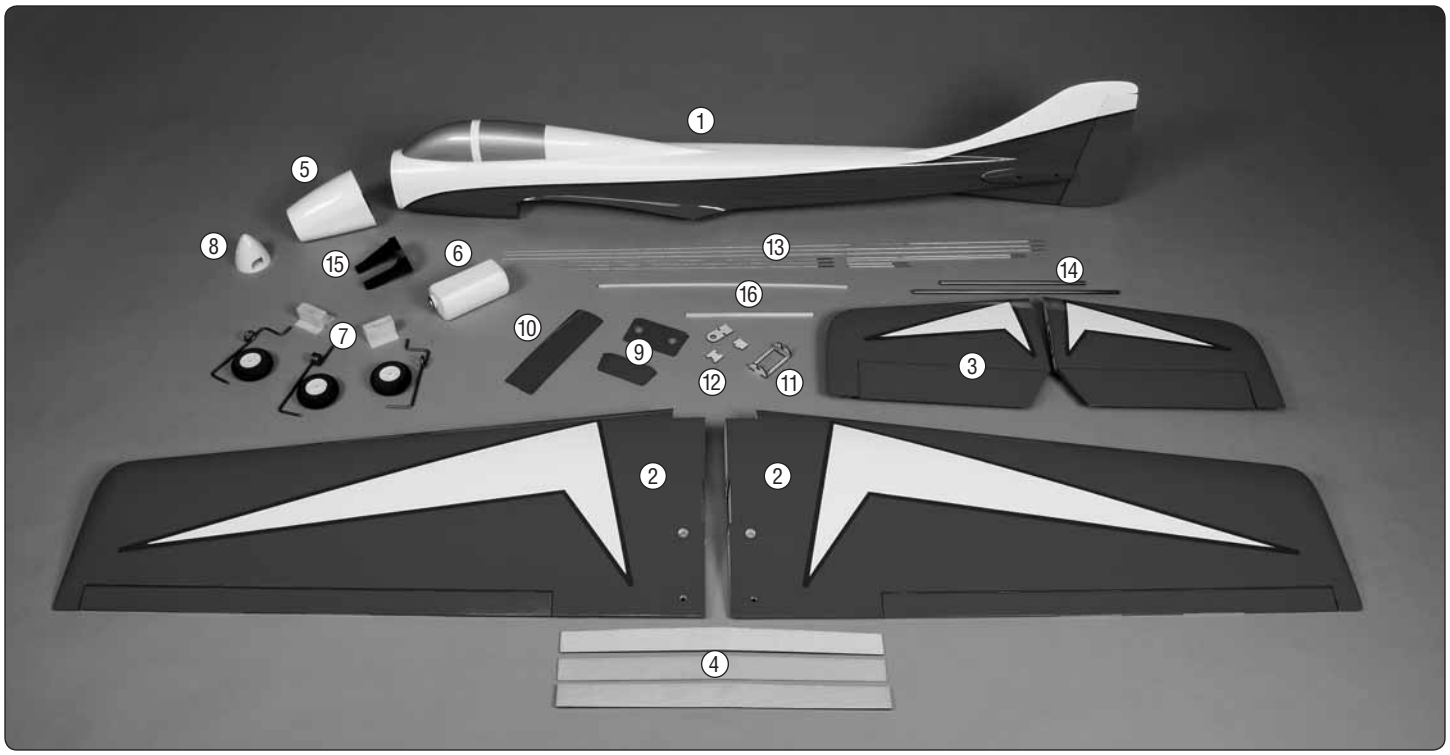
Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

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

REPLACEMENT PARTS LIST

Order No.	Description
GPMA2160	**WING**
GPMA2161	**FUSELAGE**
GPMA2162	**HORIZONTAL STABILIZER SET**
GPMA2163	**COWL**
GPMA2164	**SPINNER**
GPMA2165	**LANDING GEAR SET**
GPMA2166	**DECALS**

KIT CONTENTS



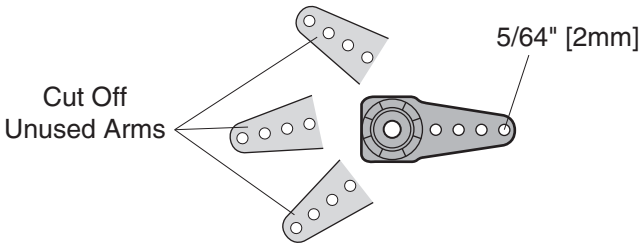
1. Fuselage
2. Wing Panels
3. Horizontal Stabilizer & Elevators
4. Wing Joiner
5. Cowl
6. Fuel Tank
7. Fixed Landing Gear
8. Spinner
9. Belly Pan
10. Nose Gear Cover
11. Retract Servo Tray
12. Air Valve Mount
13. Pushrods
14. Horizontal Stabilizer Tubes
15. Engine Mount
16. Outer Pushrod Tubes

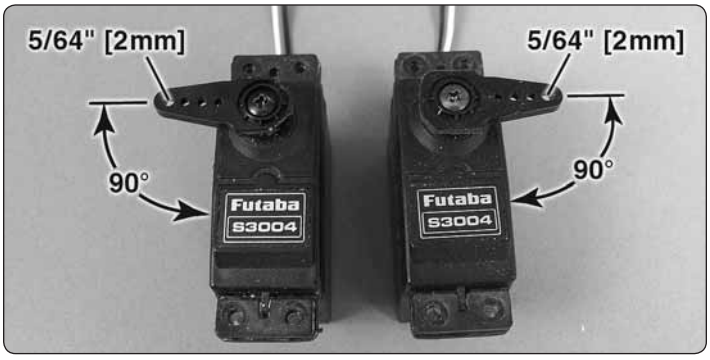
PREPARATIONS

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

❏ 2. Use a covering iron with a covering sock on high heat (350°F) to tighten the covering if necessary. Apply pressure over sheeted areas to **thoroughly** bond the covering to the wood.

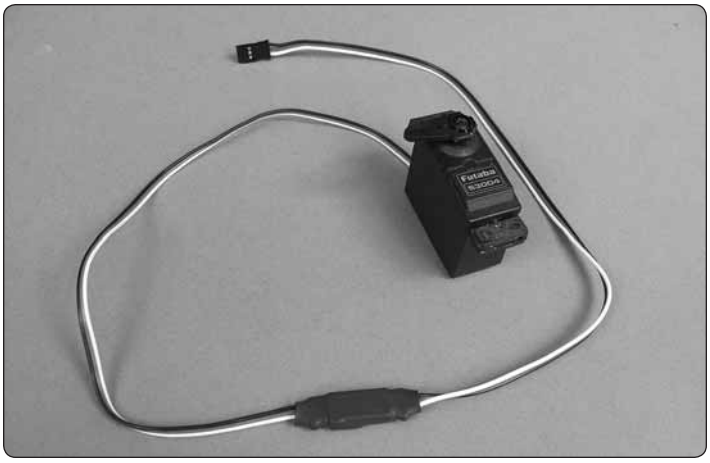
ASSEMBLE THE WINGS



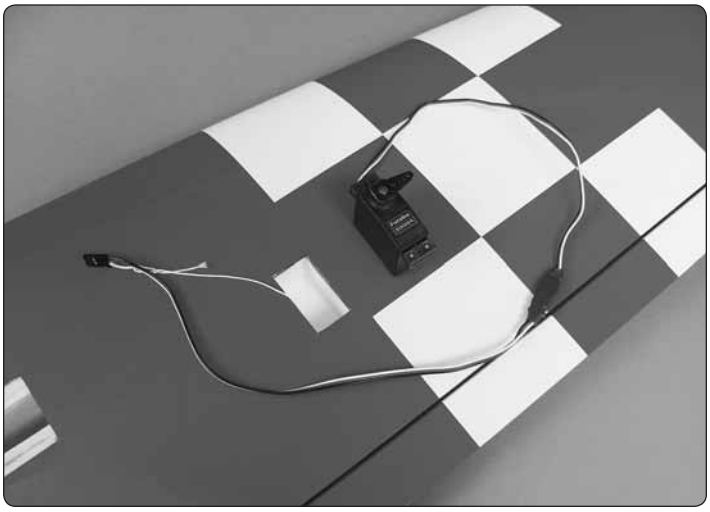


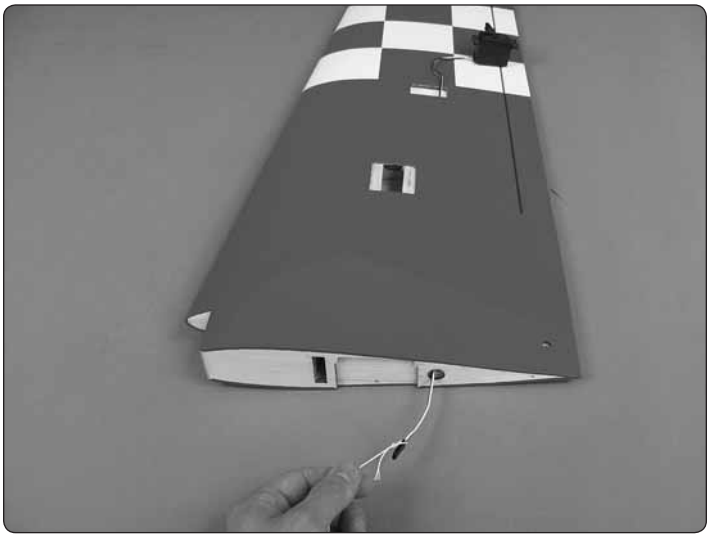
❏ 1. Center your aileron servos and trims with your radio system. Test fit four-armed servo arms onto the servos to determine their best orientation so that the arms are closest

to being perpendicular with the servo case with the transmitter trims centered. Cut three arms from each servo arm leaving one arm on each servo that matches the photo. Enlarge the outer hole of each remaining arm with a 5/64" [2mm] drill bit. Install the rubber grommets and eyelets.

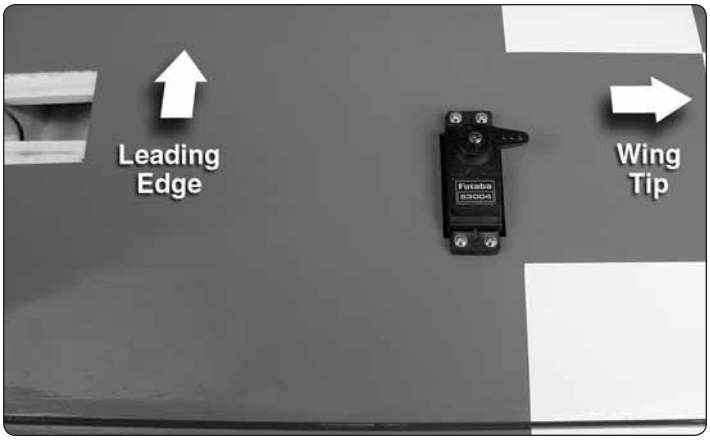


❏ 2. Attach a 12" [305mm] servo extension to each servo. Secure the connection using tape, heat shrink tubing (not included) or special clips designed for that purpose.



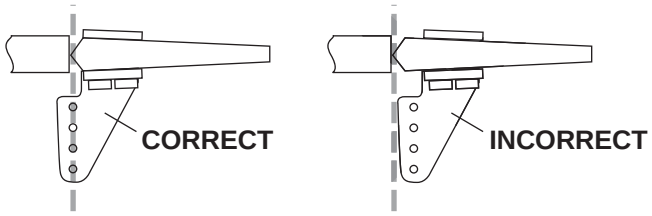


❏ 3. Use the strings taped inside the aileron servo openings to pull the servo leads through the wing panels.

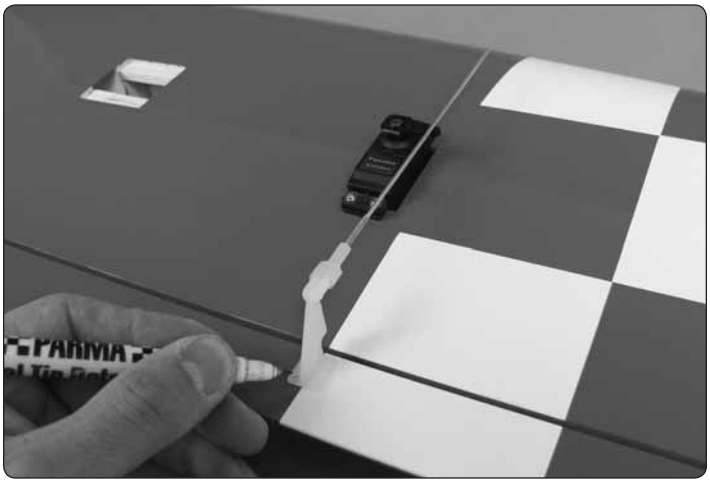


❏ 4. Fit the servos into the servo openings and drill 1/16" [1.6mm] holes through the mounting tabs on the servo cases into the rails. Thread a servo mounting screw (included with the servo) into each hole and back it out. Apply a drop of thin CA to each hole to harden the wood surrounding the wood. When the CA has dried, install the servos into the openings as shown using the screws supplied with the servos.

❏ 5. Thread a nylon clevis onto each of the two 6" [152mm] pushrods 20 complete turns. Slide a silicone clevis retainer onto the base of each clevis. Attach each clevis to the outer hole of a large control horn.

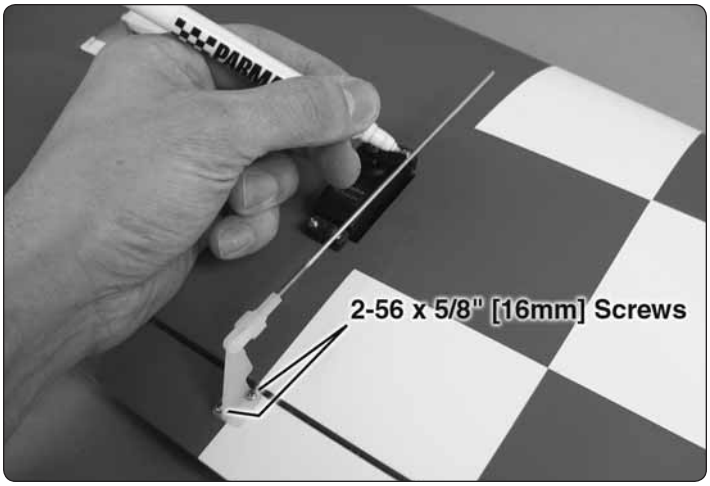


Hinge Line Hinge Line

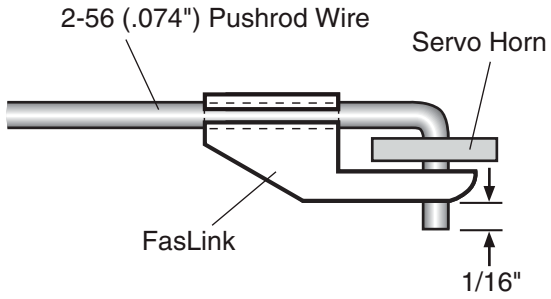


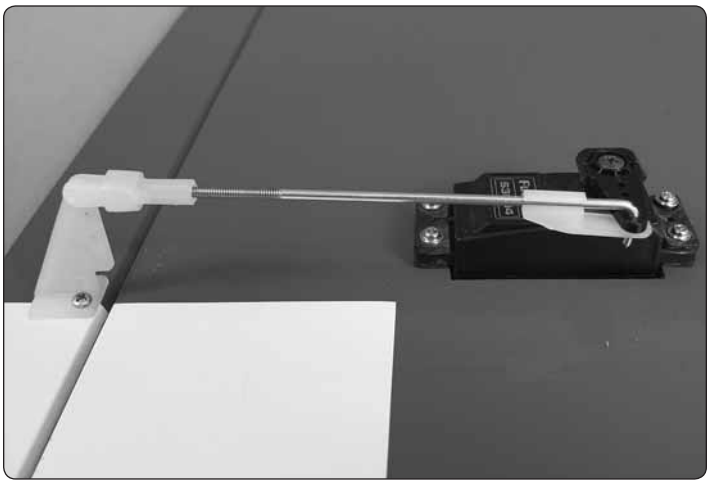
❏ 6. Position a control horn onto the aileron aligning the pushrod with the outer hole of the aileron servo arm. Position the control horns over the plywood plates in the ailerons (if you cannot see them, hold the aileron at a shallow angle in

good lighting or use a small pin to puncture the covering). When satisfied, use a felt-tip pen to mark the location of the control horn mounting holes onto the aileron. Repeat this step for the other wing panel.

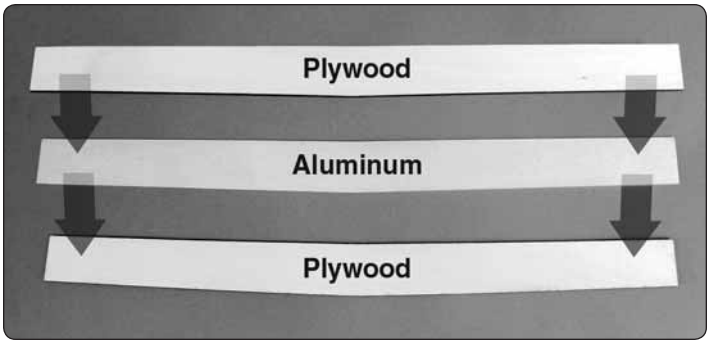


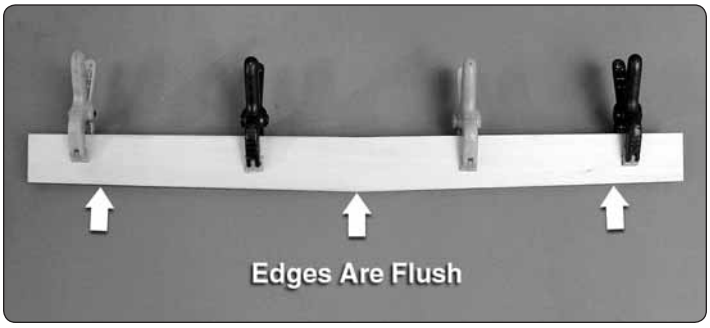
❏ 7. Drill 5/64" [2mm] holes through the aileron at the marks you made. Install the control horns onto the ailerons using 2-56 x 5/8" [16mm] machine screws and control horn backplates. With the ailerons in the neutral position (use tape or small clamps to hold them in place), mark the pushrod wires where they cross the outer hole in the servo arms.





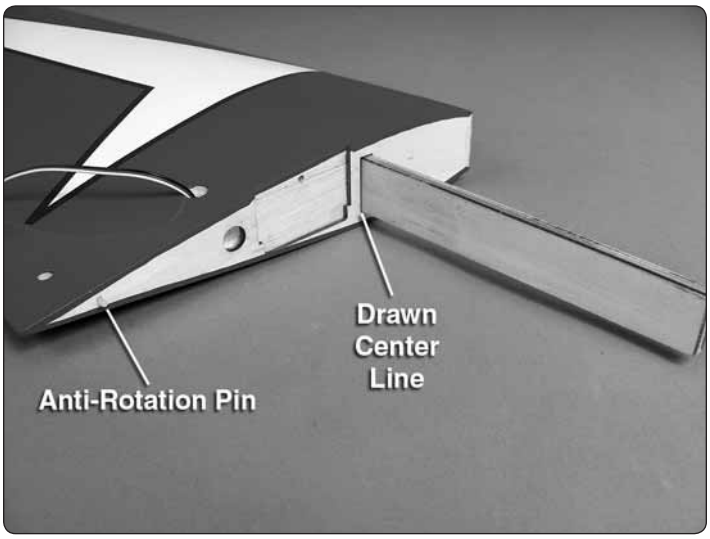
❏ 8. Make a 90 degree bend at the mark on each pushrod and cut off the excess pushrod 1/4" [6mm] beyond the bends. Attach the pushrods to the servo arms using nylon FasLinks. Thread the clevises up or down on the pushrods as necessary to center the ailerons with the servo arms still perpendicular to the servo cases. When satisfied, slide the silicone clevis retainers to the ends of the clevises to secure them.



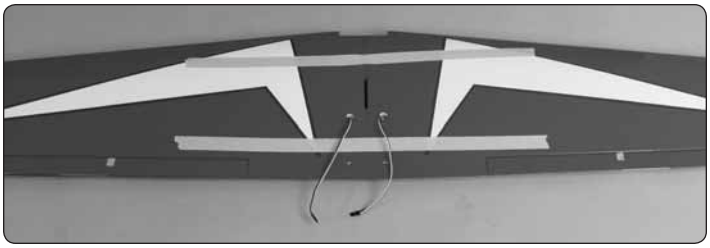


❏ 9. Prepare the aluminum wing joiner piece by roughening both sides of it with 180-220 grit sandpaper. Clean the piece with denatured alcohol. Use epoxy to laminate the three wing joiner pieces together with the aluminum piece in the center. Wipe away any excess epoxy using a paper towel dampened with denatured alcohol and use small clamps to hold the parts together while the epoxy cures. Be sure that the edges of each piece are flush with the others.

❏ 10. Route the aileron servo leads through the holes in the top of the wing panels.



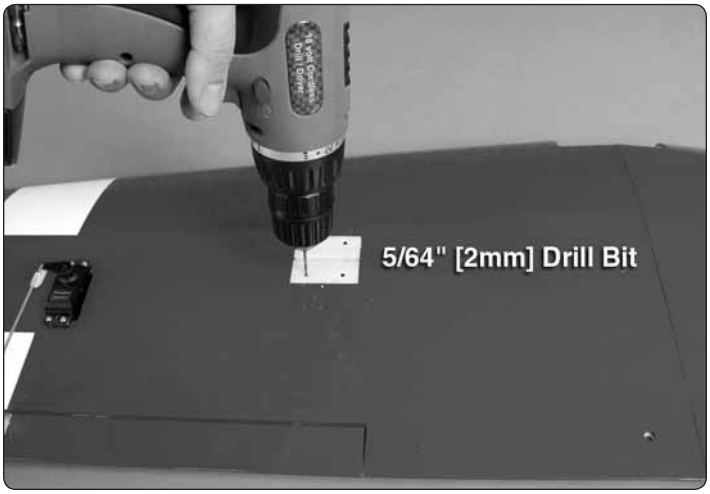
❏ 11. When the epoxy from step 9 has cured completely, test fit the joiner into each wing panel. Make sure that the joiner can be inserted halfway into each joiner pocket (the point of the "v" shape of the joiner should point towards the underside of the wing. Drawing a line down the center of the joiner is helpful.) The joiner should be a slightly loose fit in each panel to allow space for epoxy. Sand the sides or edges of the joiner until the proper fit is achieved. Insert the nylon anti-rotation pin halfway into the hole in one wing panel and test fit the two panels together.



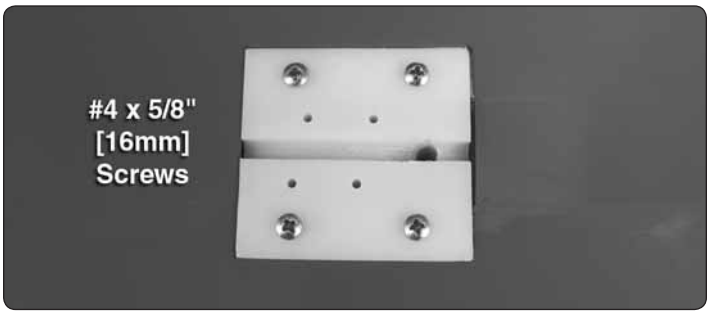
❏ 12. When satisfied with the fit of the panels, mix up approximately 20cc [20ml] of 30-minute epoxy and thoroughly coat the insides of the wing joiner pockets. Coat one half of the joiner and insert it into one of the panels. Coat the anti-rotation pin and insert it into the pin hole. Coat the other halves of the joiner and pin as well as the root ribs of the panels. Join the two panels together, taking care to wipe away excess epoxy as it squeezes out of the joint. Use masking tape to hold the panels together while the epoxy cures.

INSTALL THE FIXED LANDING GEAR

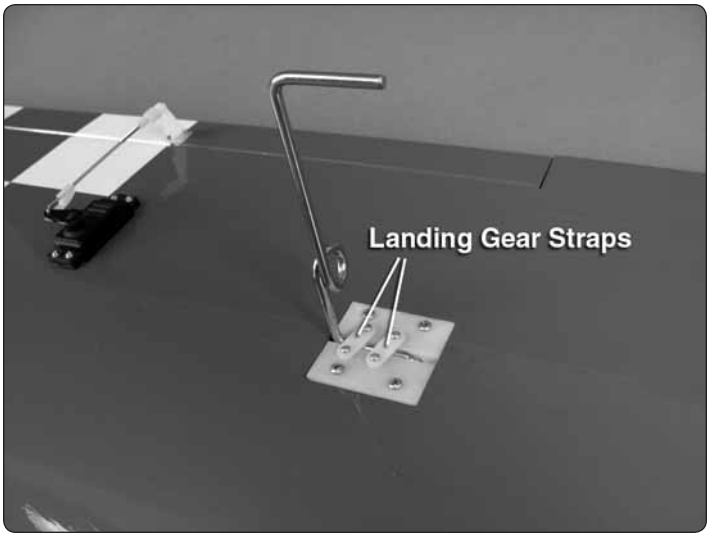
If you will be installing mechanical or pneumatic main gear retracts, skip this section.



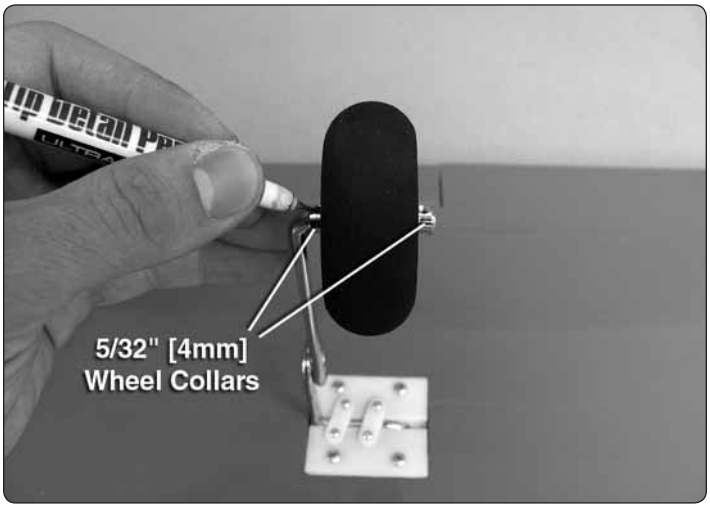
❏ 1. Insert the fixed landing gear blocks into the openings in the wing (use the other photos in this section to determine the correct orientation of the blocks). Drill through the four mounting holes on each block and into the wood rails in the wing using a 5/64" [2mm] bit.



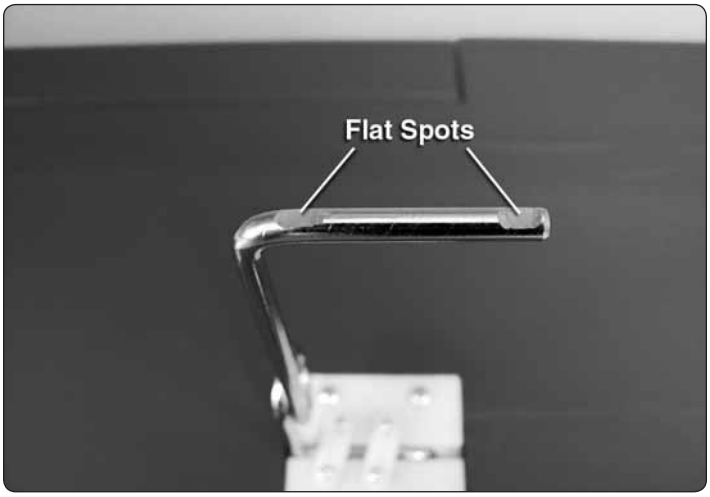
❏ 2. Remove the blocks from the wing. Thread a #4 x 5/8" [16mm] self-tapping screw into each hole and back it out. Apply a drop of thin CA to each hole and allow the glue to harden. Reinstall the blocks into the wing and secure them using eight #4 x 5/8" [16mm] self-tapping screws.



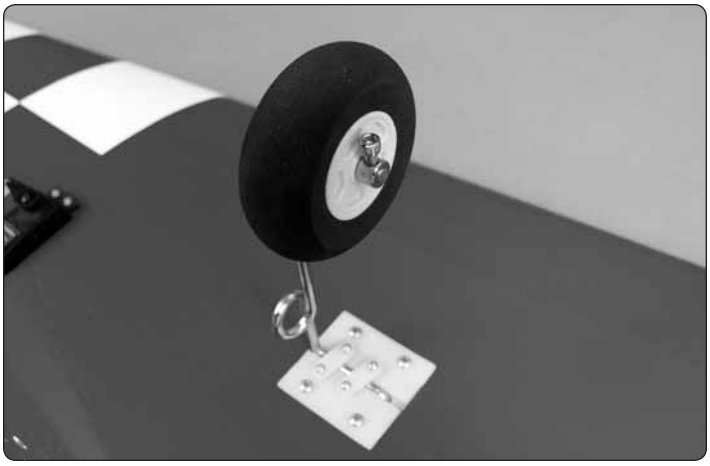
❏ 3. Fit the main landing gear wires into the blocks as shown. Use four landing gear straps and eight #2 x 3/8" [9.5mm] self-tapping screws to secure them to the blocks.



❏ 4. Slide a 5/32" [4mm] wheel collar followed by a main wheel then another 5/32" [4mm] collar onto the axles of the landing gear wires. Mark the location of the collar screw holes onto the axles using a felt-tip pen.



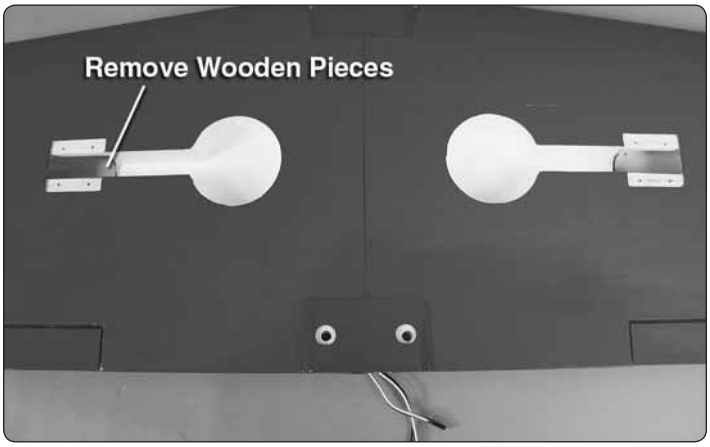
❏ 5. Use a file or rotary tool to grind flat spots onto the axles at the spots that you marked.



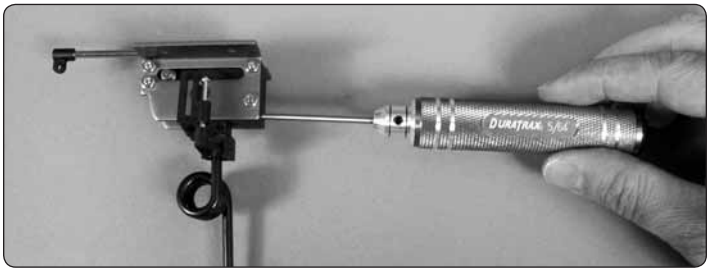
❏ 6. Apply a drop of oil (household oil or bearing oil are acceptable) to each axle. Reinstall the collars and wheels onto the axles. Secure the collars to the axles with 6-32 x 1/4" [6.4mm] SHCS and thread locking compound. Ensure that the wheels rotate freely on the axles.

INSTALL THE OPTIONAL HOBBICO MECHANICAL LANDING GEAR

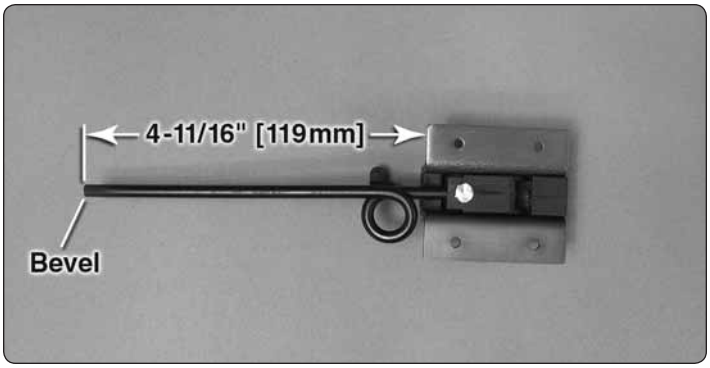
If you have installed the fixed main gear, skip this section.



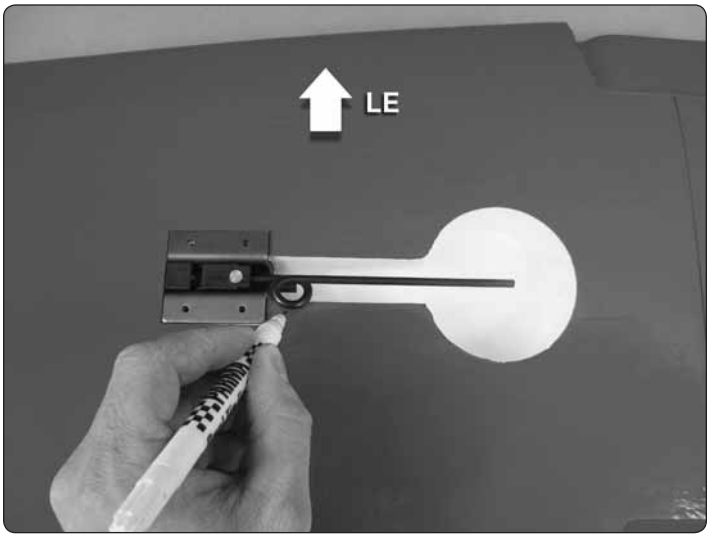
❏ 1. Trim the covering from the main wheel wells on the underside of the wing. There are small pieces of wood supporting the covering that must also be removed.



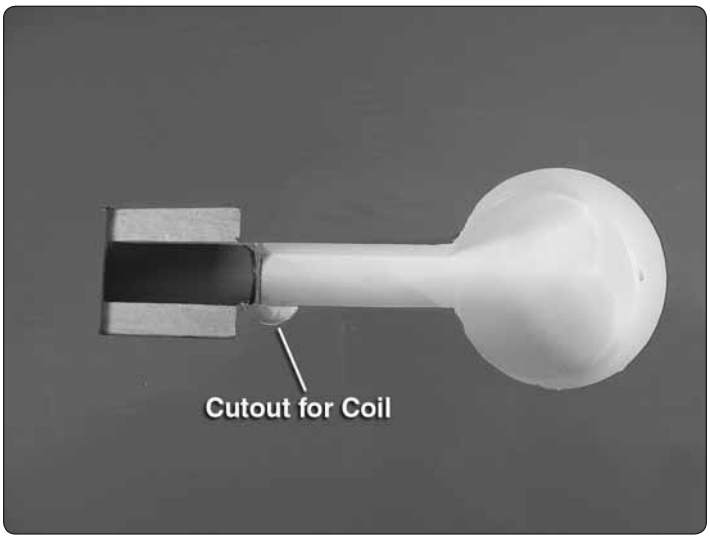
❏ 2. Prepare the mechanical retracts by adjusting the up and down lock set screws as described in the instructions that came with the retract set (with tool in hand, adjust the nose retract as well). Removing the free play ensures that the plane will taxi straight and smoothly down the runway. Do not skip this step.



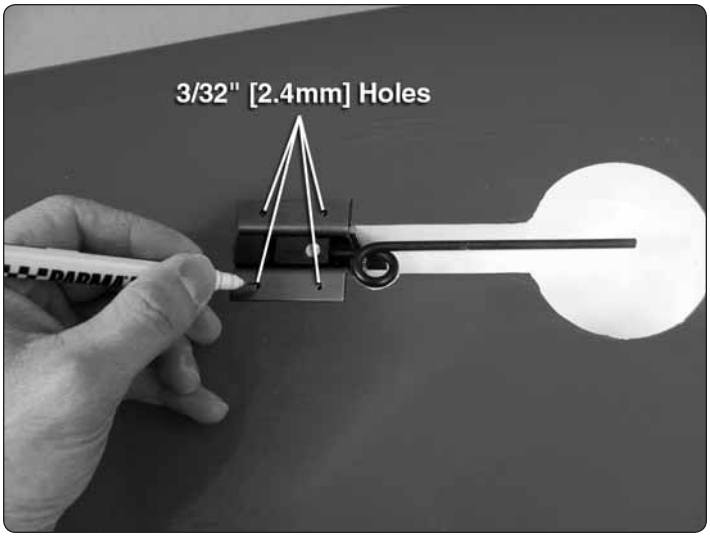
❏ 3. Cut the landing gear struts to 4-11/16" [119mm] as shown. File a small bevel onto the ends of the struts to ease the installation of the axles.

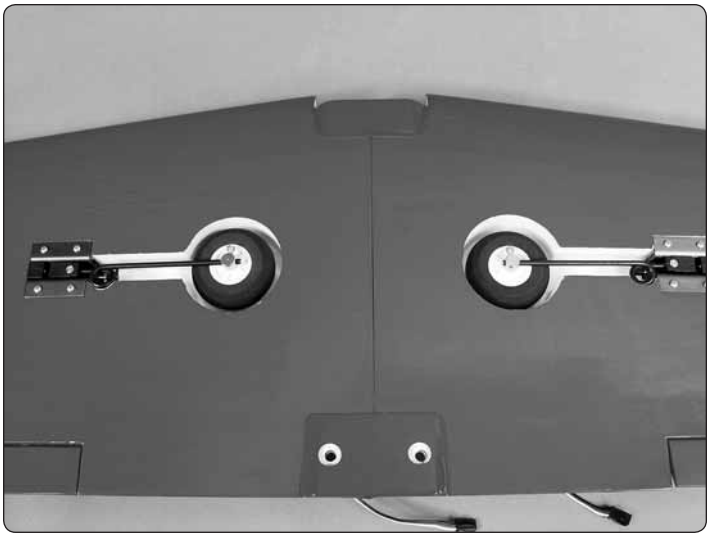


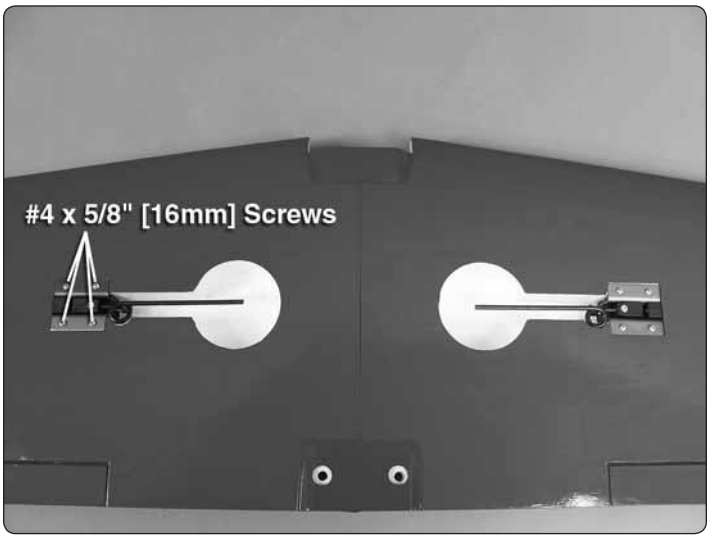
❏ 4. Set the retracts into position on the rails. Trace the outline of the coils (the portion that overlaps the sheeting) onto the underside of the wing as shown.

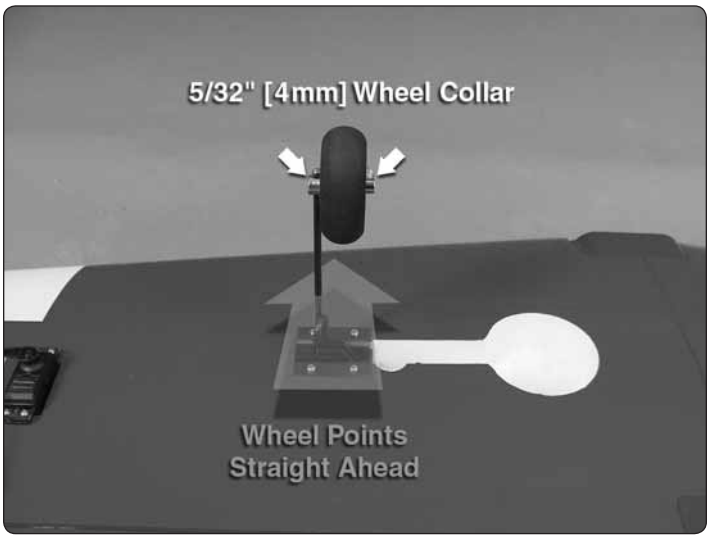


❏ 5. Cut out a small section using your marks as a guide. The cutouts should be just deep enough to accommodate the coils when the retracts are in the up position. Test fit the retracts onto the rails to ensure the coils fit into your cutouts. When satisfied, coat the exposed foam and sheeting edge with epoxy or foam safe CA.

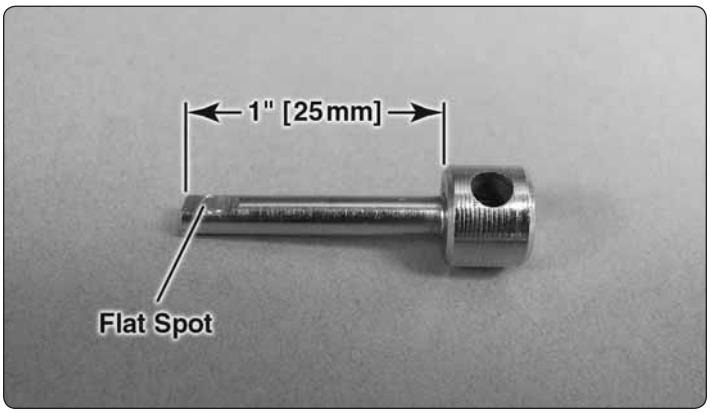






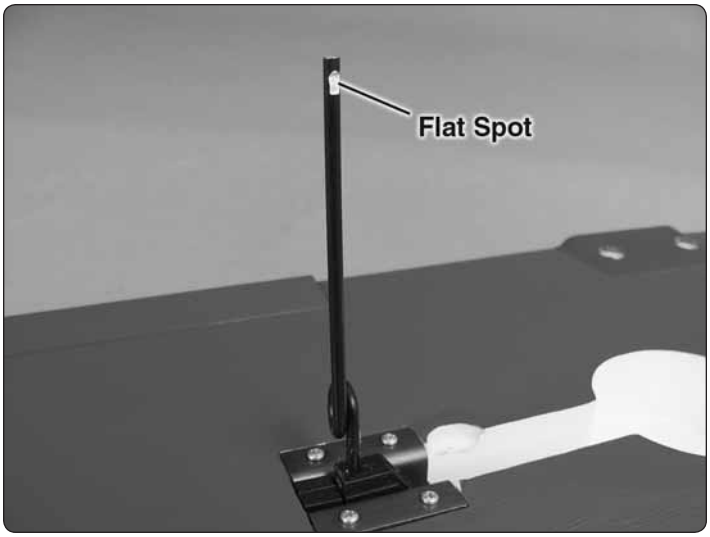


❏ 6. Temporarily slide the axle shown in step 7 onto the end of the gear struts to ensure they are centered in the wheel wells. Mark the locations of the retract mounting holes onto the rails. Drill 3/32" [2.4mm] holes at your marks. Thread a #4 x 5/8" [16mm] self-tapping screw into each hole and then back it out. Apply a drop of thin CA to each hole and let the glue harden. Install the retracts using eight #4 x 5/8" [16mm] self-tapping screws.



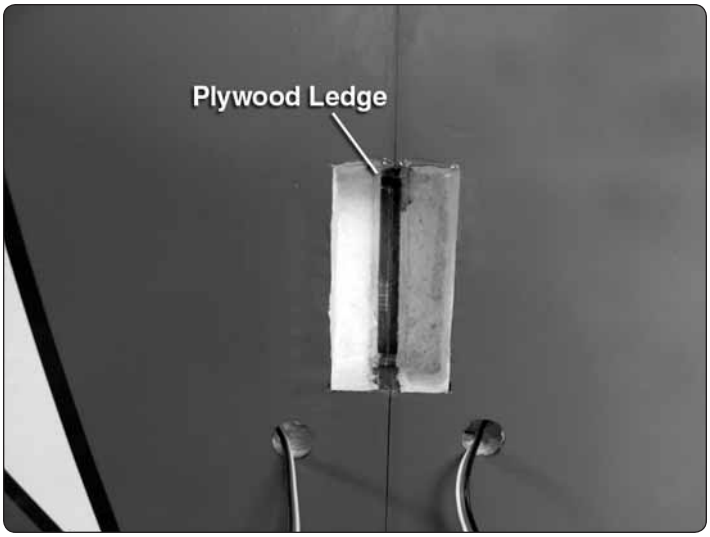
❏ 7. Cut three 5/32" x 1-1/4" [4mm x 32mm] bolt-on wheel axle to 1" [25mm] long (the third one will be used for the nose gear in a later section). Grind a flat spot at the end of each axle using a flat spot or rotary tool.

❏ 8. Slide a wheel onto each axle and secure them with a 5/32" [4mm] wheel collar, 6-32 x 1/4" [6mm] SHCS and thread locking compound. A drop or two of oil on the axles will ensure that the wheels rotate freely. Loosely thread a 6-32 x 1/4" [6mm] SHCS into each axle. Slide the axles onto the ends of the struts and move the retracts to the locked up position. Position the axles on the struts so that the wheels are centered in the wheel wells. Tighten the SHCS in the axles just tight enough to hold them in place on the struts. Move the retracts to the down position. Rotate the axles on the struts so the wheels point straight ahead. Thoroughly tighten the SHCS in the axle.

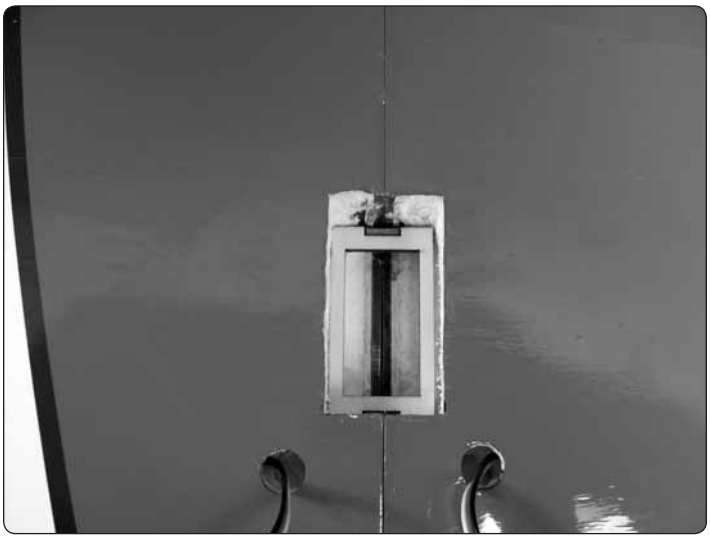


❏ 9. Remove the axles from the struts. A mark will be left on the struts from tightening the screws in the previous step. Grind a flat spot at each mark. Reinstall the axles onto the struts and tighten the SHCS against the flat spots with thread locking compound.

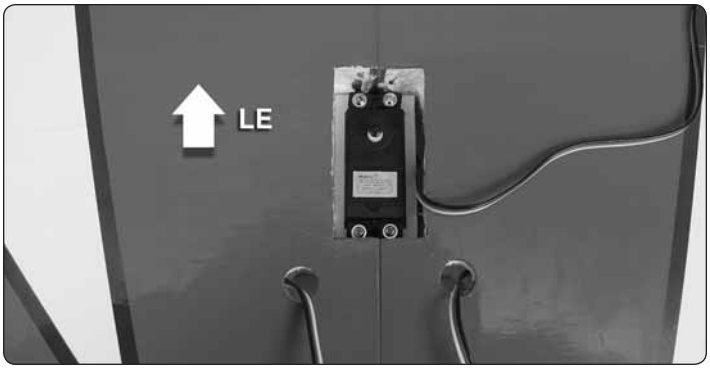
❏ 10. Center the retract servo tray over the slot in the wing as shown. Use a felt-tip pen to trace around the tray onto the wing.



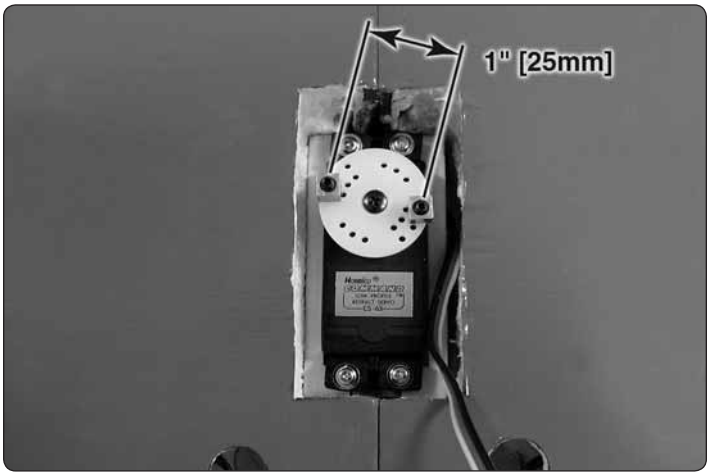
❏ 11. Cut out a section of the wing for the retract servo tray using your lines as a guide. The depth of the cutout is defined by the slot that you aligned the tray over in the previous step. A variety of tools could be used to remove the foam and balsa material. We suggest first using a hobby knife to cut around the perimeter of your lines as deep as the knife blade will allow. Use a small flat blade screw driver to work out the portion that you have so far cut away. Use a rotary tool with a sanding drum bit to remove most of the remaining material. Work carefully as the sanding drum will cut aggressively through the foam. Once you get near the bottom of the plywood slot, switch to a 1/8" [3mm] (or a similar bit size) drill bit in your rotary tool and use the flutes of the bit to clean up the walls of the cutout. Make several zigzagging passes to clean up the bottom of the cutout. There will be a plywood ledge at the bottom of the cutout at both the forward and aft ends. The notches in the servo tray fit onto these ledges.



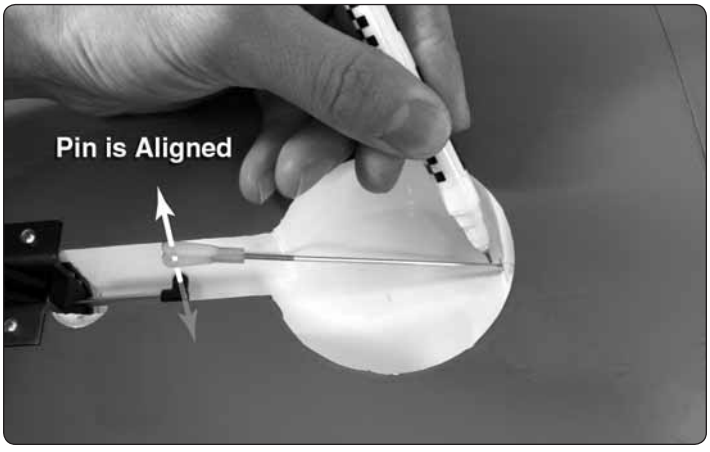
❏ 12. When satisfied with your cutout, test fit the servo tray in the cutout. Be sure it can be fully seated onto the plywood ledges. If not, use a hobby knife to scrape away any remaining balsa or glue that may be preventing the tray from fully seating.



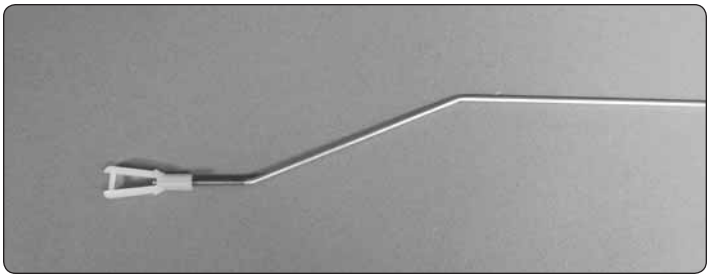
❏ 13. Use the hardware included with the retract servo to mount it to the servo tray. Be sure to harden the servo mounting holes with thin CA glue. Coat the notches of the tray with epoxy as well as the plywood ledges in the cutout. Glue the tray into the cutout.



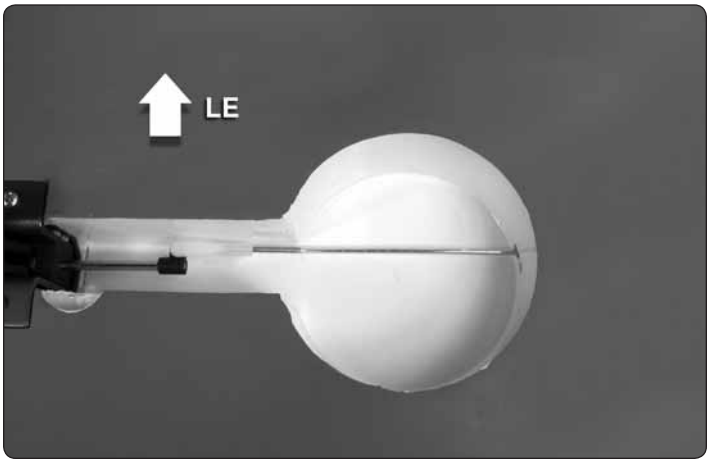
❏ 14. Check the rotation of your retract servo using your radio. The servo shown in the picture will rotate clockwise to raise the wheels into the wells. Attach two brass screw lock connectors to a servo wheel (a two-armed servo arm would also work) so that they are 1" [25mm] apart and positioned slightly angled from being perpendicular to the servo case. To ensure that the retracts open from lock to lock we recommend setting the screw-lock connectors close to 1" [25mm] apart. Loosely install two 4-40 set screws in the screw lock connectors.



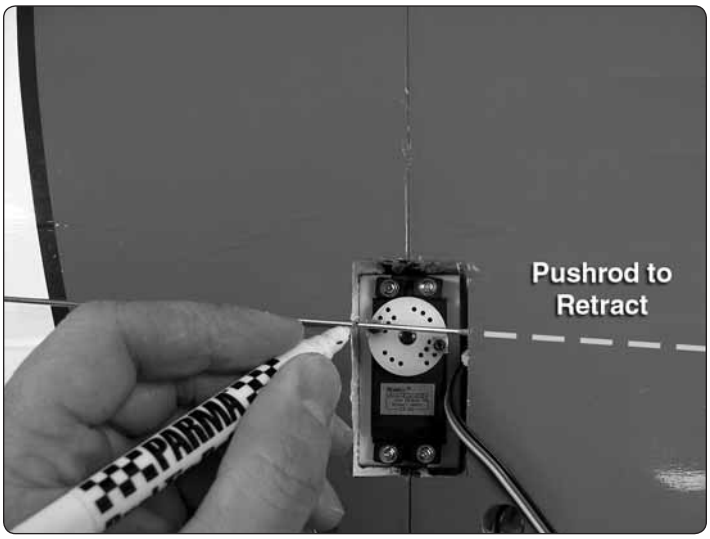
❏ 15. Thread a nylon clevis 20 complete turns onto a 12" [305mm] pushrod. Insert the pushrod through the hole at the inboard side of a wheel well. Align the pin in the clevis over the actuator link on the retract when the retract is in the down (landing) position. Make a mark on the wire just beyond the hole in the wheel well.



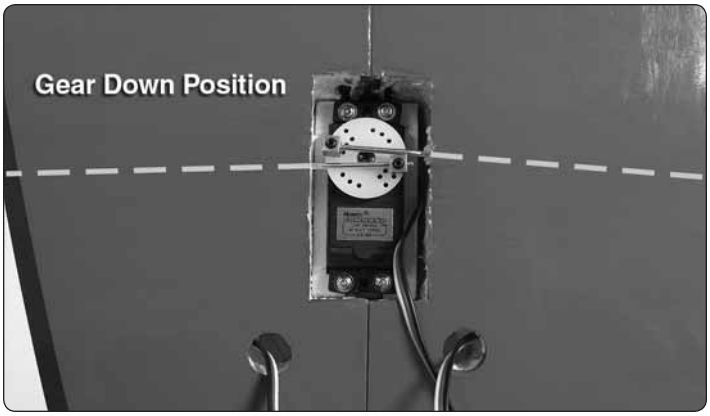
❏ 16. Make a shallow bend in the wire at your mark and another bend just behind the threaded portion of the pushrod (you may need to adjust the angles of the bends after you test fit the pushrod into the wing.

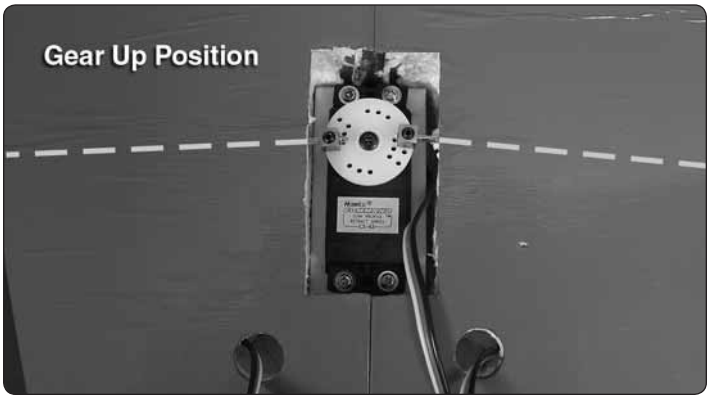


❏ 17. Reinsert the pushrod into the wing and connect the clevis to the actuator link on the retract. Rotate the link so it is closest to the leading edge of the wing as shown. Make any adjustments to the bends in the pushrod so that the wire lays as close to the bottom of the wheel well as possible. The pushrod must not interfere with the wheel going up into the wheel well.



❏ 18. Mark the pushrod where it meets the opposite edge of the retract servo cutout in the wing (with the gear in the landing position.) Cut off the excess pushrod at this mark.



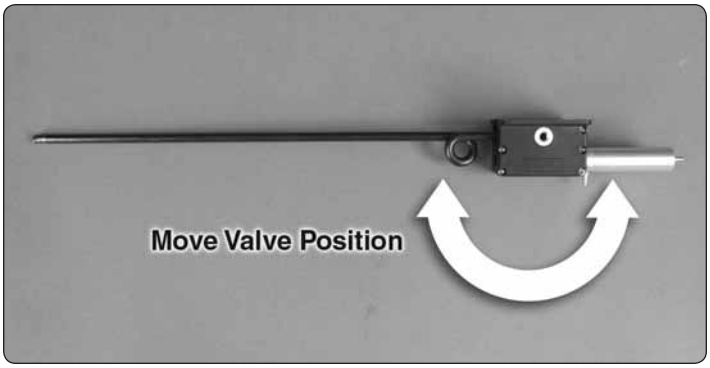


❏ 19. Fit the end of the pushrod into the screw lock connector on the opposite side of the servo as the retract. Repeat steps 15-18 for the other retract. Tighten the set screws in the screw lock connectors and test the operation of the retracts. The gear must raise and lower lock to lock. If the gear is not locking in position, adjust the positions of the pushrods in the connectors.

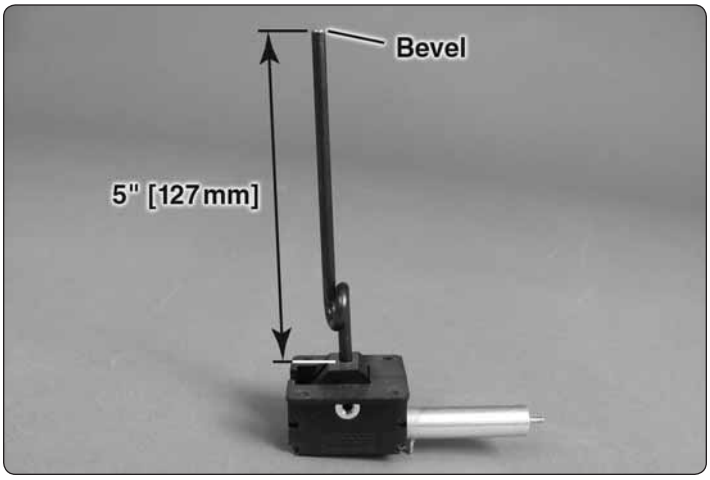
INSTALL THE OPTIONAL ROBART PNEUMATIC LANDING GEAR

If you have installed the fixed or mechanical main gear, skip this section. Additional hardware is required that is not included with the Dirty Birdy ARF to install pneumatic retracts. See the beginning sections of this manual for a detailed list of the required hardware.

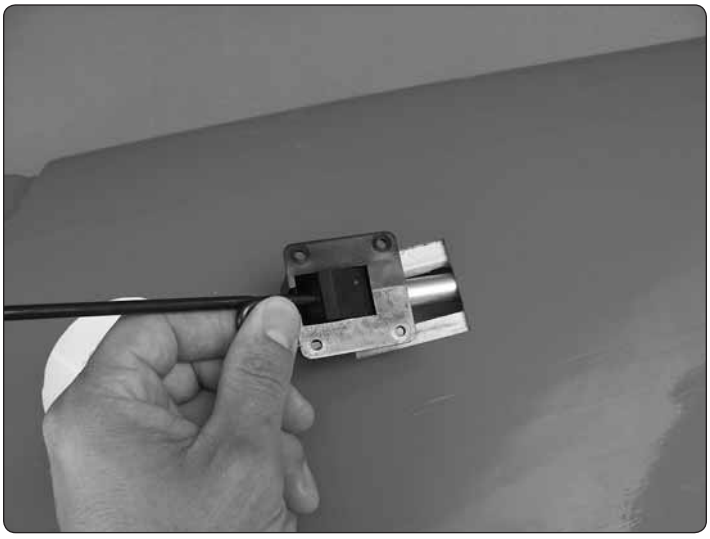
❏ 1. Trim the covering from the main wheel wells on the underside of the wing. There are small pieces of wood supporting the covering that must also be removed.



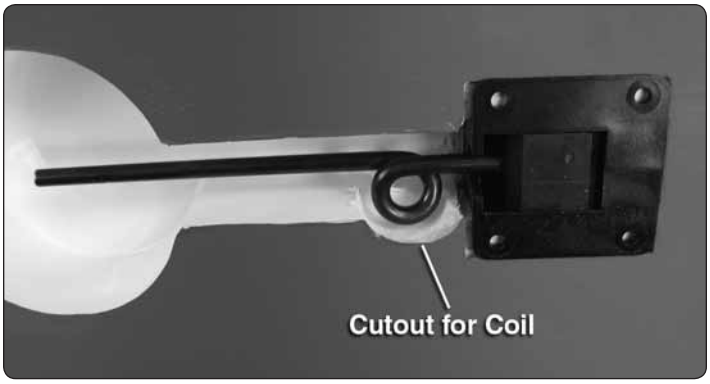
❏ 2. Open the pneumatic retract cases and flip the positions of the valves to the opposite side as shown in the photo.



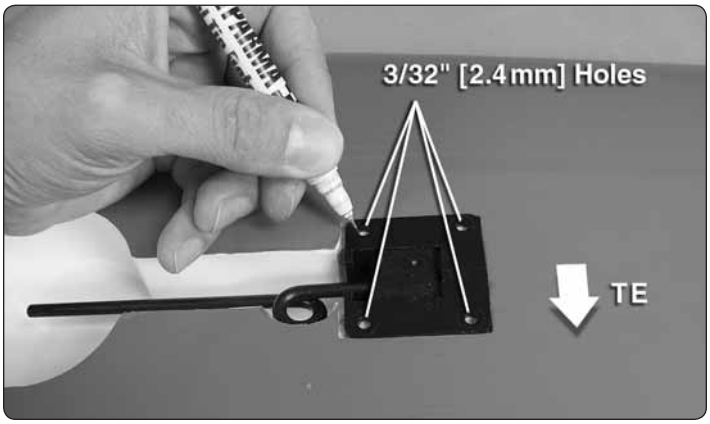
❏ 3. Cut the retract struts to 5" [127mm] as shown in the photo using a rotary tool and cutoff wheel. File a small bevel onto the ends of the struts to ease the installation of the axles. Loosen the set screws that holds the struts in the retract assemblies. Rotate the struts so that the coils in the wires are inline with the rolling direction of the wheels. Tighten the set screws against the wire in order to make marks on the wires. Remove the struts completely from the retracts, file flat spots at the marks from the set screw, and then reinstall the struts using thread locking compound on the set screws.



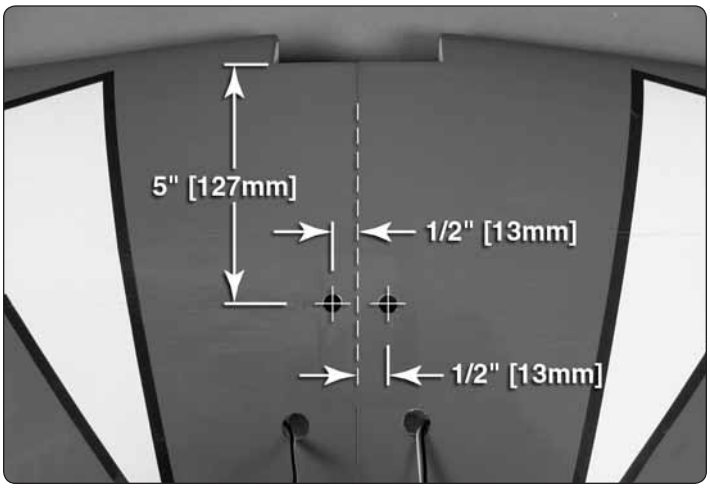
❏ 4. Trim the hardwood landing gear mounting rails as necessary in order to fit the retract assemblies in place.



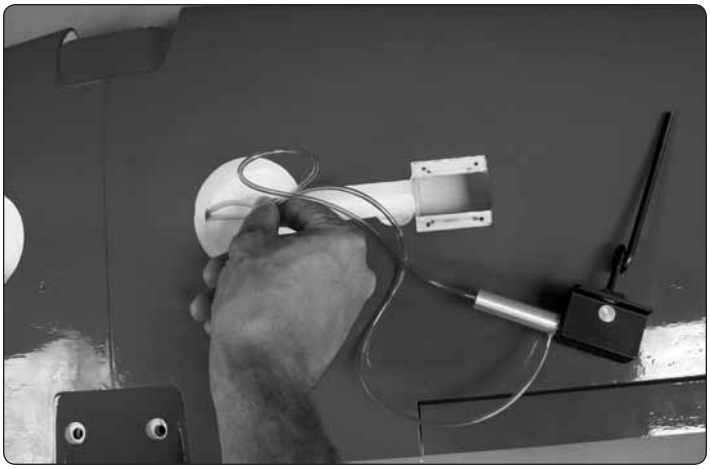
❏ 5. With the retract assemblies temporarily in place, mark the wing where cutouts will be made to accommodate the coils in the struts. Remove the struts and use a rotary tool with a drum sander bit to carve away the wing up to the marks you made. Reinstall the retracts and confirm that the struts can move up and down without interference. When satisfied, coat the exposed foam and sheeting edge with epoxy or foam-safe CA.

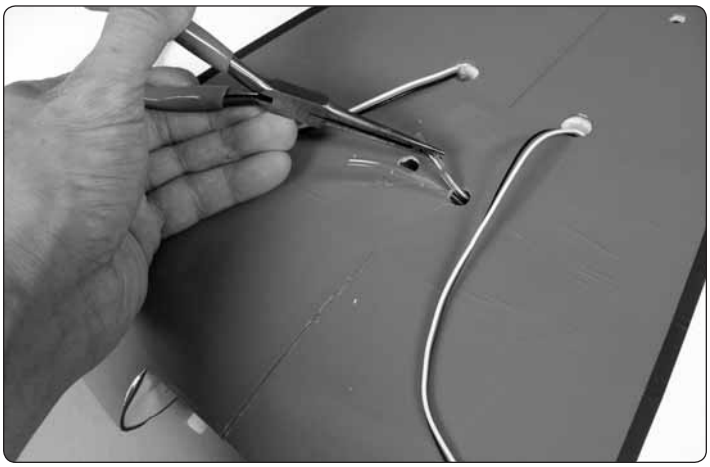


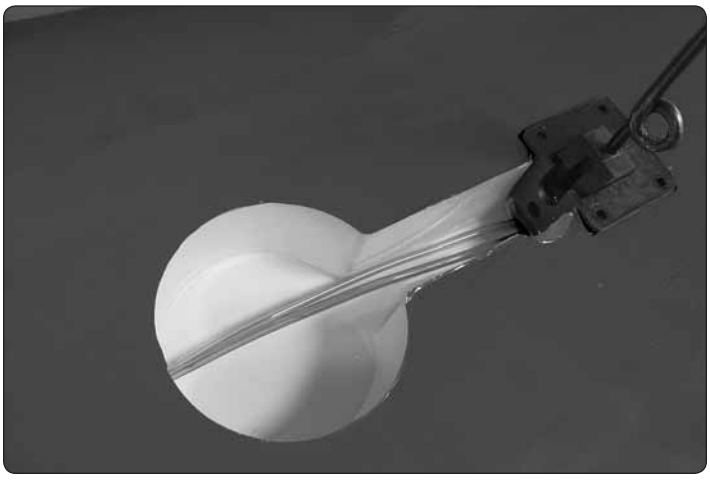
❏ 6. Temporarily slide the axle shown in step 10 onto the end of the gear strut to ensure they are centered in the wheel wells. Mark the locations of the mounting holes onto the retract rails. Remove the retracts and drill 3/32" [2.4mm] holes at your marks. Thread a #4 x 5/8" [16mm] self-tapping screw into each hole and then remove it. Apply a couple drops of thin CA to each hole and allow the glue to harden.



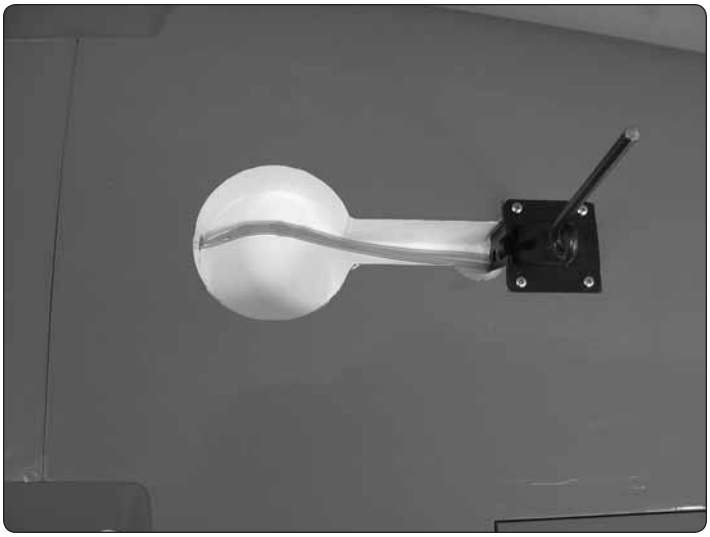
❏ 7. Turn the wing over and measure back 5" [127mm] from the center leading edge of the wing and make a mark approximately 1/2" [13mm] on each side of the seam of the wing panels. Cut a 5/16" to 3/8" [8 to 9.5mm] hole at each mark you made through the sheeting to a depth, approximately 1/4" [6.4mm], which exposes the channels cut into the foam core of the wing. We suggest using either a rotary tool or a brass tube with a sharpened edge to make the holes.



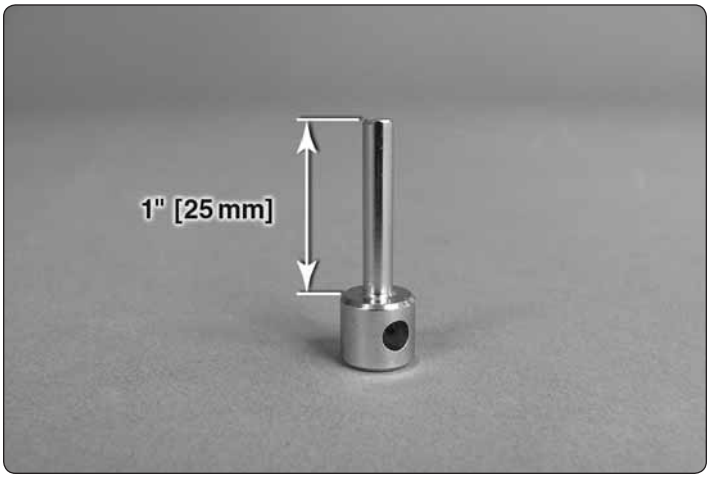




❏ 8. Connect air lines approximately 16" [406mm] long to the retract valves. Use different color lines for each side of the valves to simplify the T-connections you will make later. Consult the Robart manual for details. Feed the lines through the channels cut through the inside core of the wing. Grab the ends of the lines through the holes you cut in the previous step and pull them out. Fit the retracts back into the wings, being sure that the lines are not pinched. Push a little excess line underneath the retracts to ease removal should it be necessary.

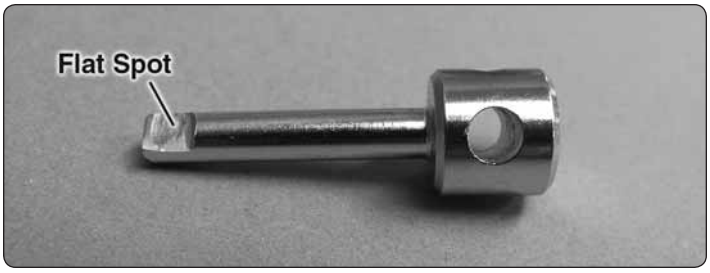


❏ 9. Install the retracts using #4 x 5/8" [16mm] self-tapping screws. Use medium or thick CA to glue the air lines flat against the wheel wells and out of the way of the center of the wells.

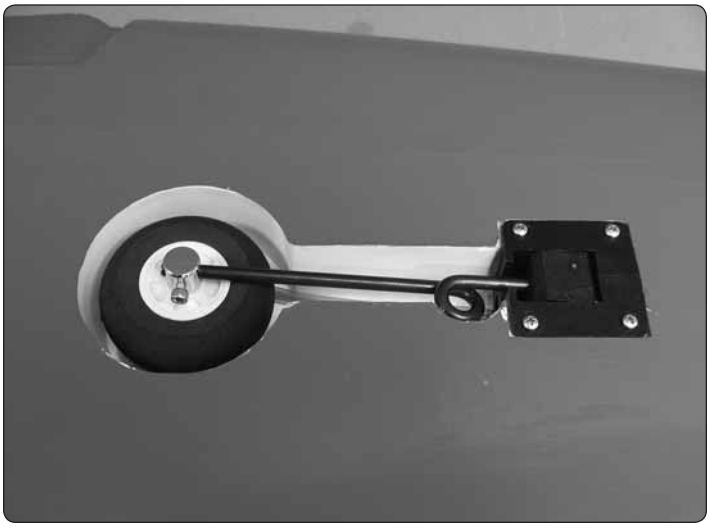


❏ 10. Cut two 2" x 3/16" [51mm x 4.8mm] wire axles (not included) to 1" [25mm].

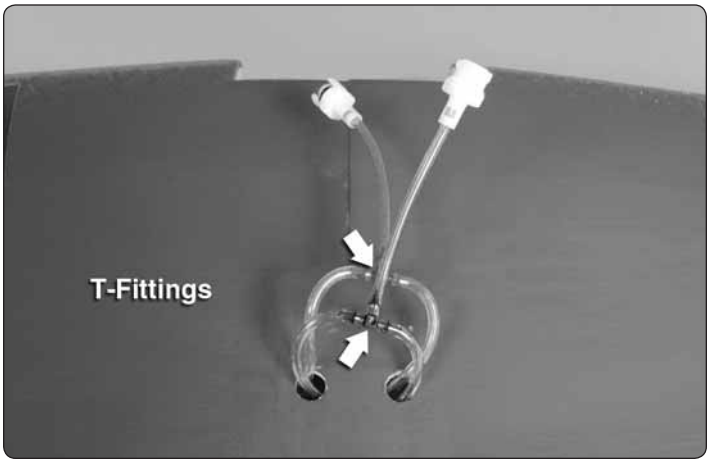
❏ 11. Enlarge the axle holes in the included main wheels using a 13/64" [5.2mm] drill bit. Slide the wheels onto the axles followed by a 3/16" [4.8mm] wheel collar (not included). Mark the location of the wheel collar screw holes onto the axles.



❏ 12. Use a rotary tool or file to grind a flat spot onto the axles at the marks you made. Add a drop of oil to each axle and reinstall the wheels onto the axles. Secure the wheel collars using 6-32 set screws and thread locking compound.

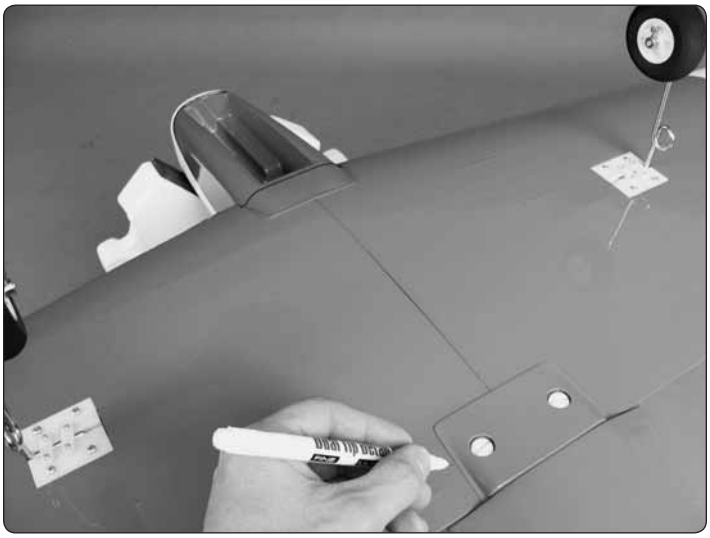


❏ 13. Loosely install a 6-32 x 1/4" [6.4mm] SHCS into each axle. Slide the axles onto the retract struts and raise the wheels into the wheel wells. Position the axles on the struts so that the wheels are centered in the wells. Gently tighten the screws in the axles against the struts. Raise the struts and confirm that the wheels will be aligned straight when the wing is installed on the fuselage. When satisfied, thoroughly tighten the screws against the struts. Doing so will leave marks on the struts. Remove the axles, grind flat spots at the marks you made, and then reinstall the axles with thread locking compound on the screws.

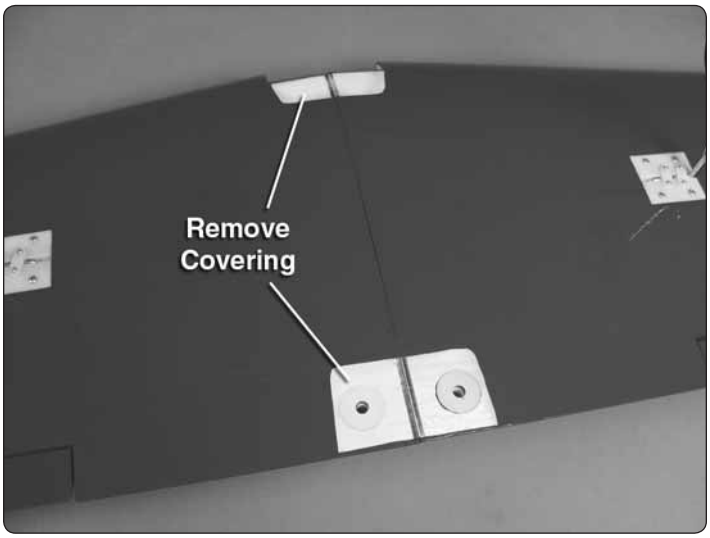


❏ 14. Join the matching colors of air line with T-fittings (not included) and attach a quick disconnect (not included) to each T-fitting with a short length of air line.

MOUNT THE WING



❏ 1. Mount the wing to the fuselage using two 1/4-20 x 2" [51mm] nylon wing bolts. Align the forward and aft belly pan pieces onto the wing as shown. Trace around the pieces onto the wing using a felt-tip pen.



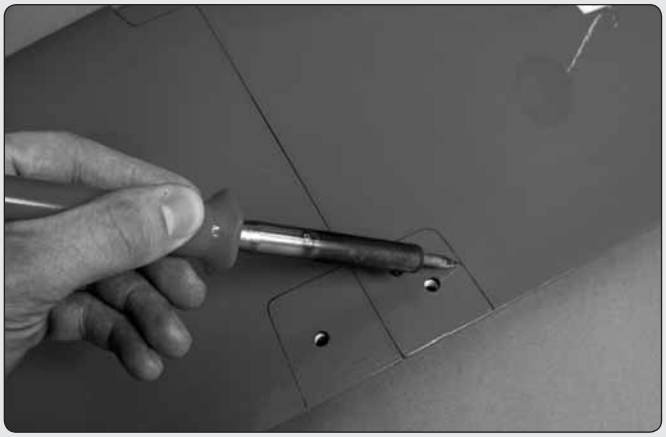
❏ 2. Carefully cut the covering 1/16" [1.6mm] inside the lines you drew and remove the covering (it may be easier to remove the wing from the fuselage before performing this step). Use a sharp hobby knife and take care to only cut through the covering and not into the wood beneath. Use denatured alcohol to wipe away the lines you drew (or use CA debonder). A thin coat of epoxy or CA glue around the wing bolt holes will fuel proof the wood.

See the following **Expert Tip** for an alternative method for removing covering.

EXPERT TIP

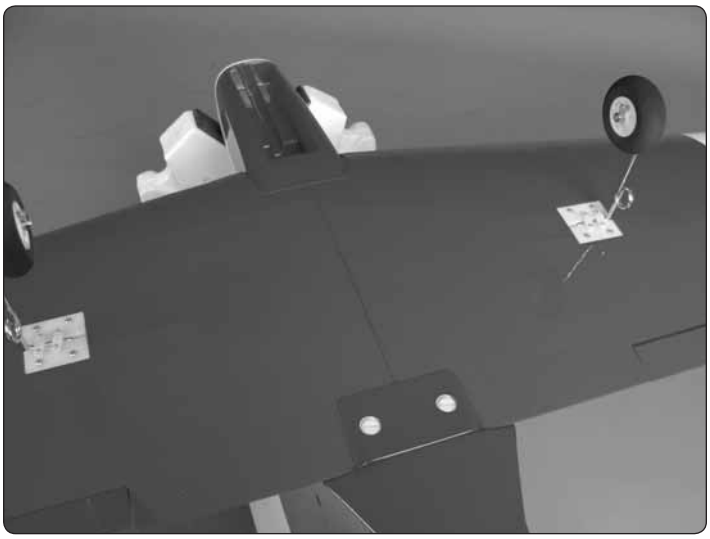
How to Cut Covering from Balsa

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



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

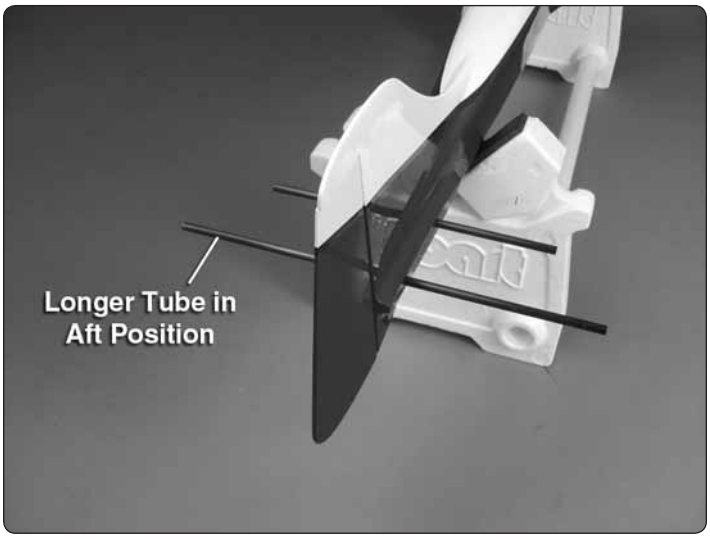
❏ 3. Cut a piece of wax paper or plastic wrap to put between the wing and the fuselage at the forward and aft ends. This will prevent the wing from being accidentally glued to the fuse. With the pieces in place, reinstall the wing onto the fuselage.



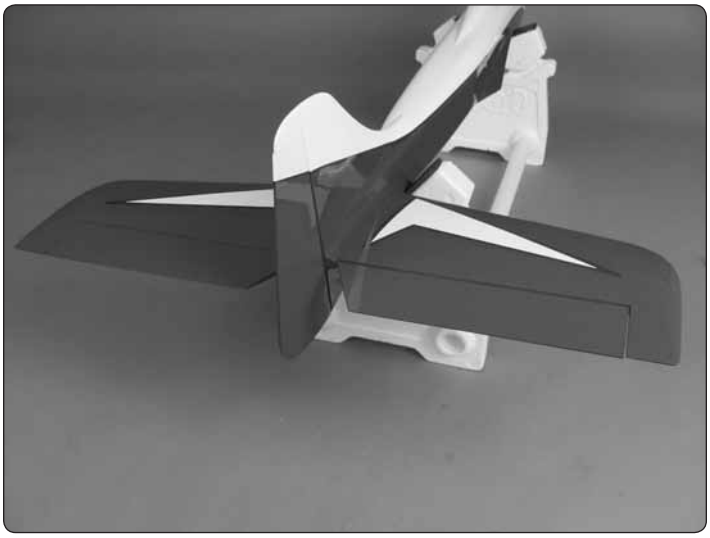
❏ 4. Apply small dots of medium or thick CA around the perimeter of the belly pan pieces. Align the pieces with the fuselage and glue them into place as shown.

❏ 5. The wing can now be removed and set aside until it is needed again to balance the airplane and check the control throws.

INSTALL THE STABILIZER AND TAIL SERVOS



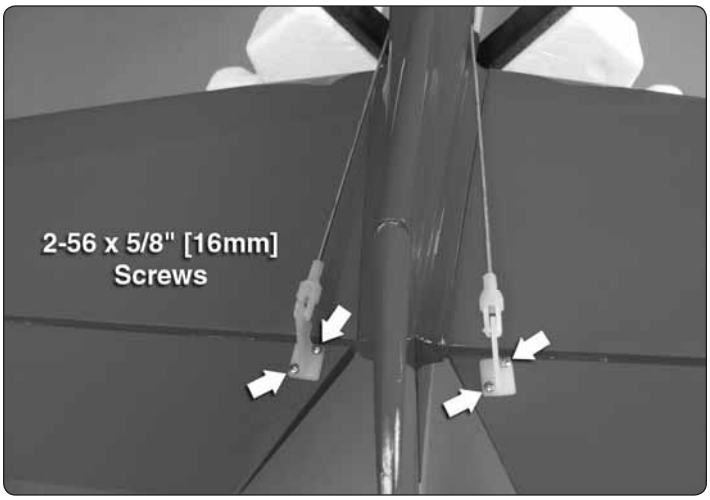
❏ 1. Test-fit the carbon stabilizer tubes in the fuselage and center them left and right.



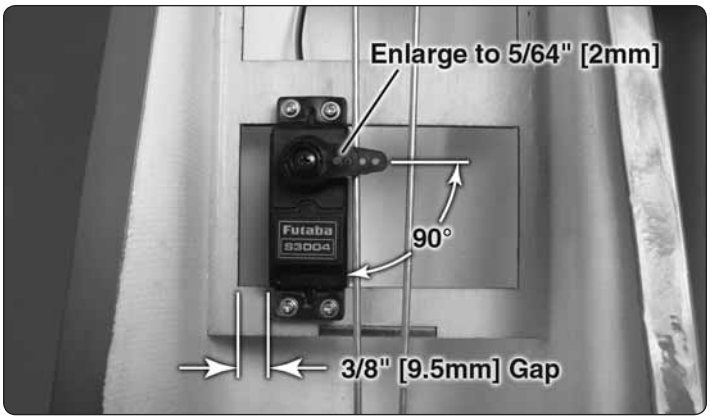
❏ 2. Test-fit the left and right stabilizer halves onto the stab tubes. If the stabilizer halves are difficult to install onto the tubes, you may need to bevel the ends of the tubes with some sand paper.

❏ 3. When satisfied with the fit, remove the stab halves and tubes from the fuselage. Roughen the sides of the fuselage where the stab halves will install with 220 grit sand paper and clean the areas with denatured alcohol. Mix up approximately 1/4 oz [7.5cc] of 30-minute epoxy. Apply a thin coat onto one half of each stab tube and insert the coated ends into one stab half. Coat the other ends of the tubes, the roots of the stab halves, and the mating sides of the fuselage. Assemble the stab halves onto the fuselage taking care to wipe away any excess epoxy that squeezes out as you slide the halves together. Clean around the roots of the stab halves and then use masking tape to hold the stab halves tightly against the fuselage until the epoxy has completely cured.

❏ 4. Thread a clevis (20 turns) and silicone clevis retainer onto two 2-56 x 36" [914mm] pushrods. Attach the clevises to the second outer holes of two control horns and insert the pushrods into the elevator outer pushrod tubes. As you did with the ailerons, align the holes in the control horns over the elevator hinge lines and mark the locations of the mounting holes onto the elevators (be sure that the control horns are positioned over the hardwood plates installed in the elevators).

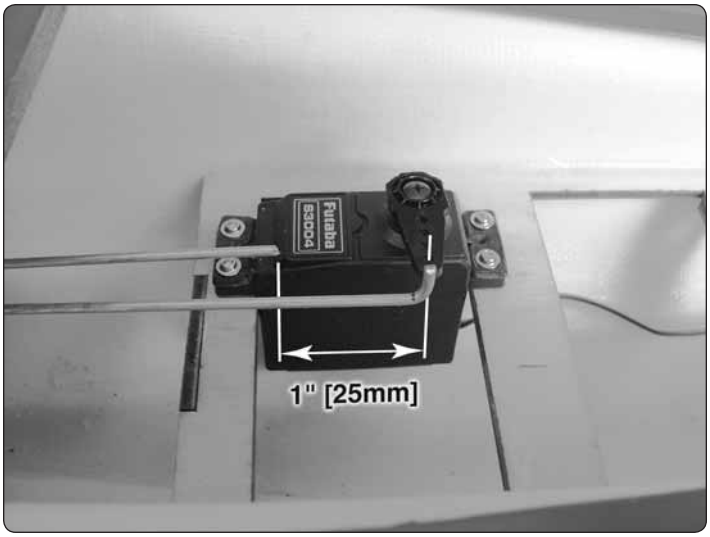


❏ 5. Drill 5/64" [2mm] holes at your marks. Install the control horns using four 2-56 x 5/8" [16mm] machine screws and control horn backplates.

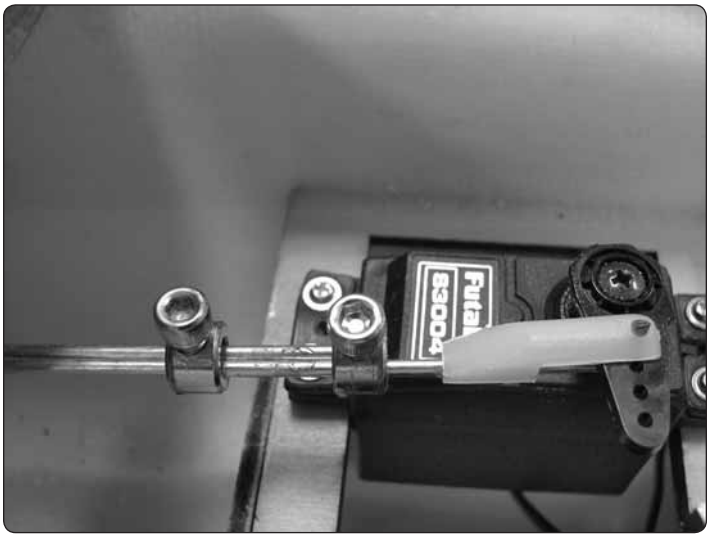


❏ 6. Electronically center your elevator servo. Determine at which orientation a four-armed servo arm fits most perpendicular to the servo case. Trim off three of the four

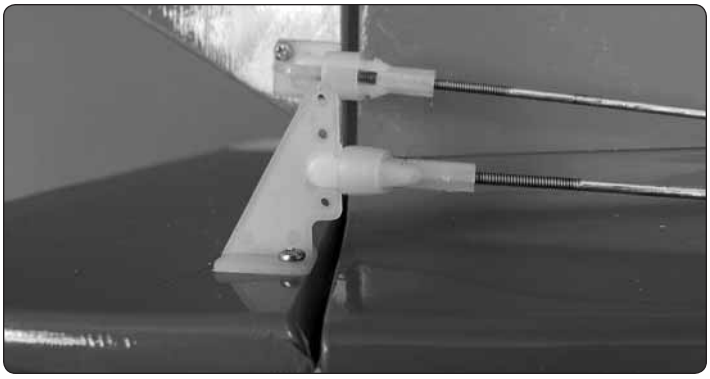
arms to match the photo. Enlarge the inner hole on the arm with a 5/64" [2mm] drill bit. Using the mounting hardware included with the servo, install it so there is approximately 3/8" [9.5mm] gap between the servo and the inner edge of the tray. Be sure to harden the servo mounting holes with thin CA glue.



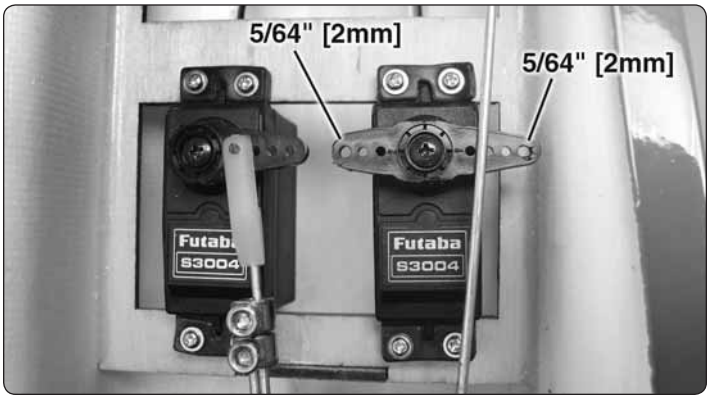
❏ 7. Center the right elevator and make a bend in the pushrod where it crosses the inner hole of the elevator servo arm. Center the left elevator and make a mark on the pushrod 1" [25mm] aft of the inner hole of the servo arm. Cut off the excess pushrod at your mark.



❏ 8. Loosely thread a 6-32 x 1/4" [6.4mm] SHCS into two 5/32" [4mm] wheel collars with threadlocking compound. Fit the wheel collars over both pushrod ends. Connect the right elevator pushrod to the servo arm and secure it with a FasLink. Slide both wheel collars just to the end of the left elevator pushrod, view the plane from behind and confirm that both elevator halves are parallel, and **thoroughly** tighten the screws in the wheel collars. Test the operation of the elevator servo with your radio. Make any fine adjustments with the clevises to bring the elevator halves perfectly parallel with each other.

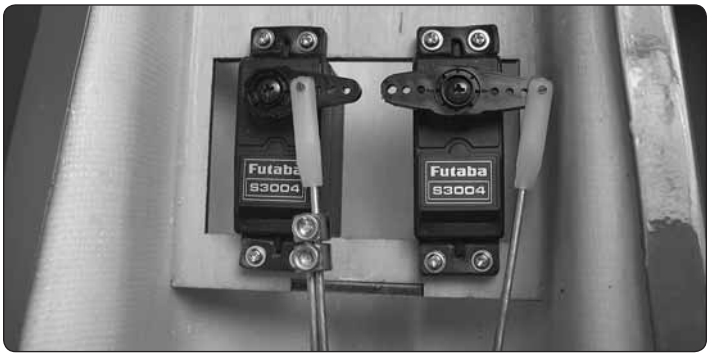


❏ 9. Install the rudder control horn using the remaining 2-56 x 36" [914mm] pushrod. The clevis should be connected to the second **inner** hole of the control horn.



Read all of step 10 before proceeding.

❏ 10. Electronically center your rudder servo and choose the best orientation of the four-armed servo arm. Cut off the two unused arms as shown in the picture. The remaining **right** servo arm was trimmed down to three holes (note that the photo shows the plane upside down). Enlarge the outer holes of both remaining arms with a 5/64" [2mm] drill bit. **IF** you will be using the **fixed** nose gear, the right servo arm described in this step is not necessary and can be cut off. The steering pushrod used for the fixed gear requires you to enlarge the second inner hole of the only remaining servo arm. Install the servo as shown.

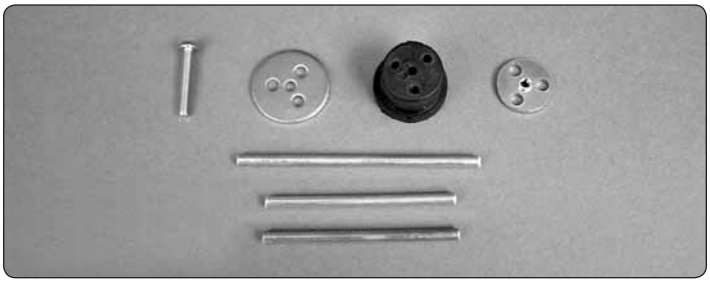


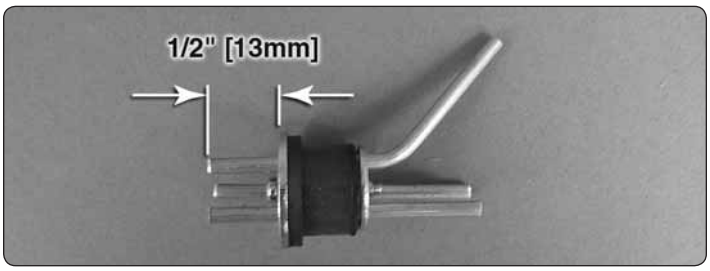
❏ 11. Center the rudder and mark where the rudder pushrod crosses the outer hole of the **left** servo arm and make a mark at that location. Bend the pushrod 90 degrees at your mark, cut off the pushrod 1/4" [6mm] beyond your mark and connect the pushrod to the servo arm with a FasLink. Adjust the clevis accordingly so the rudder is neutral when the servo arm is perpendicular to the servo case.

INSTALL THE POWER SYSTEM

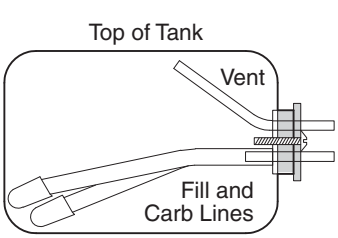
The installation of an O.S.®.61 FX engine is shown in this section. O.S. has updated their engine line to now include a .65 AX engine. The installation of the .65 AX engine is similar to the .61 FX shown.

❏ 1. Install the engine mount side mounted to the firewall using four 6-32 x 1" [25mm] machine screws, four #6 flat washers, four #6 lock washers and thread locking compound. Leave the screws slightly loose. Test fit your engine between the mount halves. Slide the mount halves against the sides of the engine and finish tightening the mount screws.

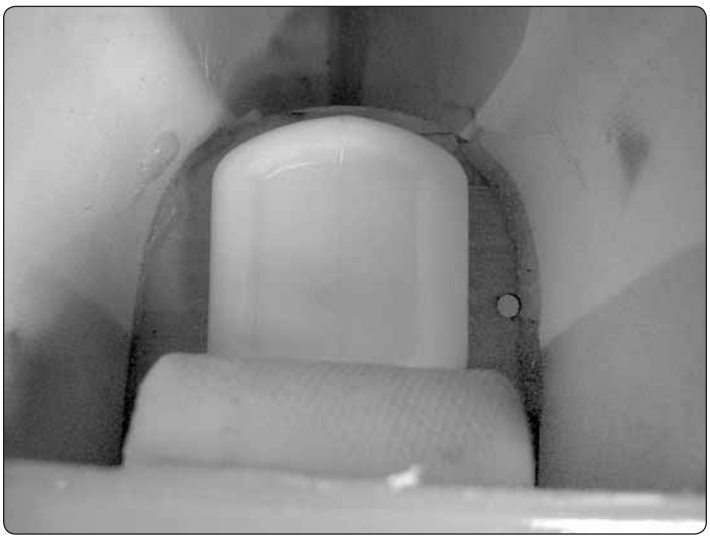




❏ 2. The fuel tank can be assembled as a two line system consisting of a vent (pressure) line to the muffler and a carb line. Filling and emptying of the tank would need to be done through the carb line, or an optional fuel fill valve (not included). The tank can also be assembled as a three line system having a vent line, carb line, and fill line. If installing a fill line, puncture the top of the stopper above the sealed off fuel tube hole. The fill and carb lines should extend out 1/2" [13mm] beyond the stopper and the vent line should be bent upwards and left uncut. With the tubes installed in the stopper, fit the stopper plates loosely in place with the 3 x 25mm phillips screw to hold the assembly together.



❏ 3. Fit the stopper assembly into the tank with the vent line pointing toward the top of the tank, but not touching. The fuel tubing and clunks (fuel pickup) on the carb and fill lines should almost reach the back of the tank but not touch. The clunks must be able to move freely inside the tank when assembled. Adjust the length of the fuel tubing accordingly. When satisfied, tighten the 3 x 25 mm screw in the stopper to secure it in place (do not over-tighten). Mark the side of the tank that must face up when installed in the plane, and we also suggest marking the tubes in the stopper.

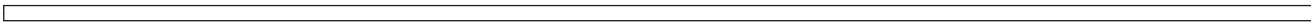


❏ 4. Insert the fuel tank through the plywood formers in the fuselage (be sure that you are installing the tank with the correct side facing up). Carefully push the tank forward until the neck of the tank passes through the hole in the center of the firewall.

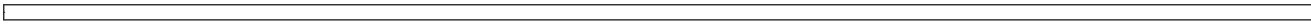
Carefully remove this insert, in order to use your full size templates on the reverse side.

MECHANICAL NOSE GEAR **ACTUATOR PUSHROD**

Top View

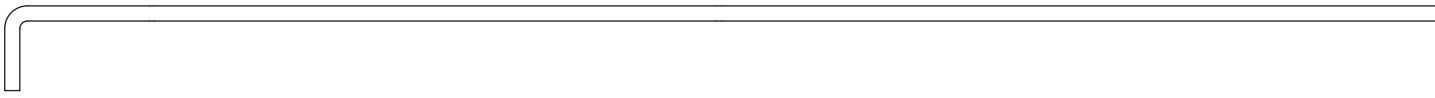


Side View

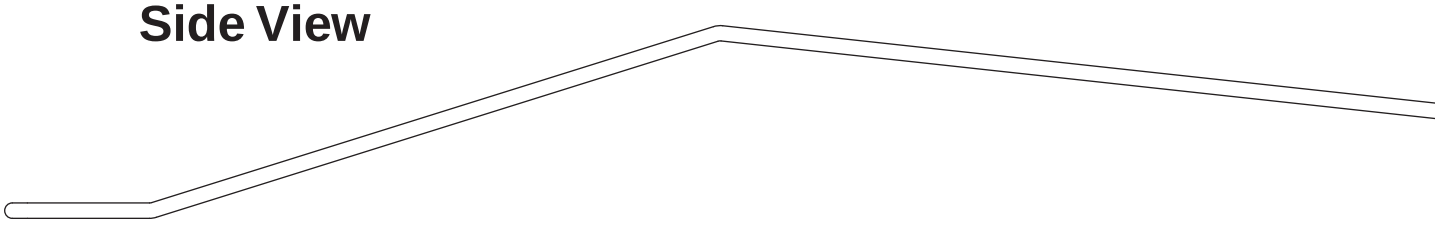


MECHANICAL/PNEUMATIC NOSE GEAR **STEERING**

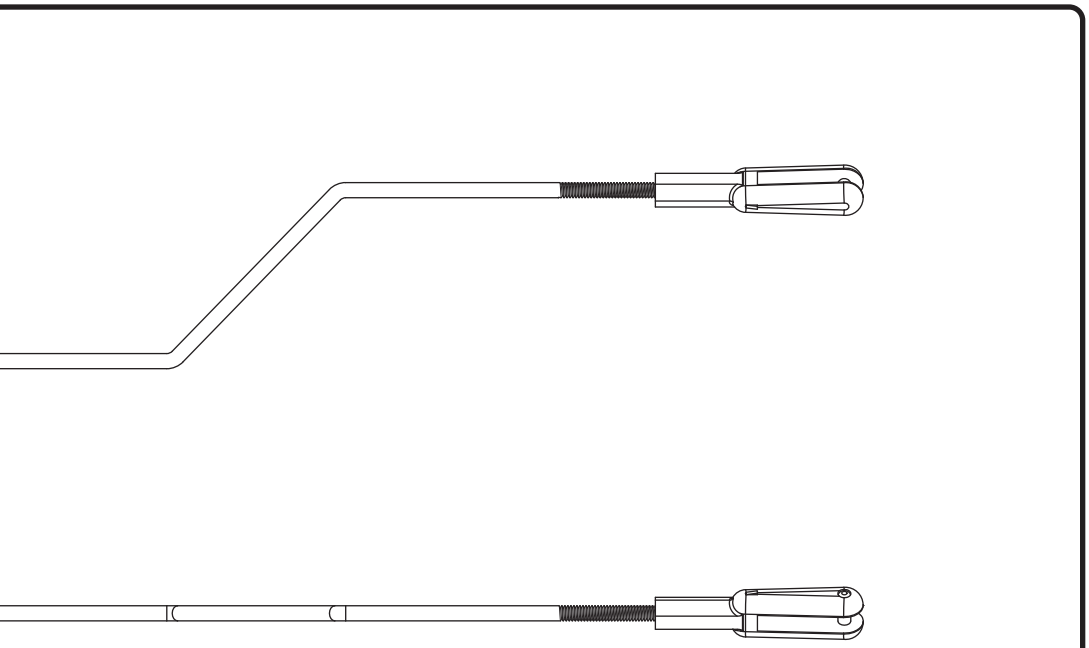
Top View



Side View



D TEMPLATE



This model belongs to:

Name

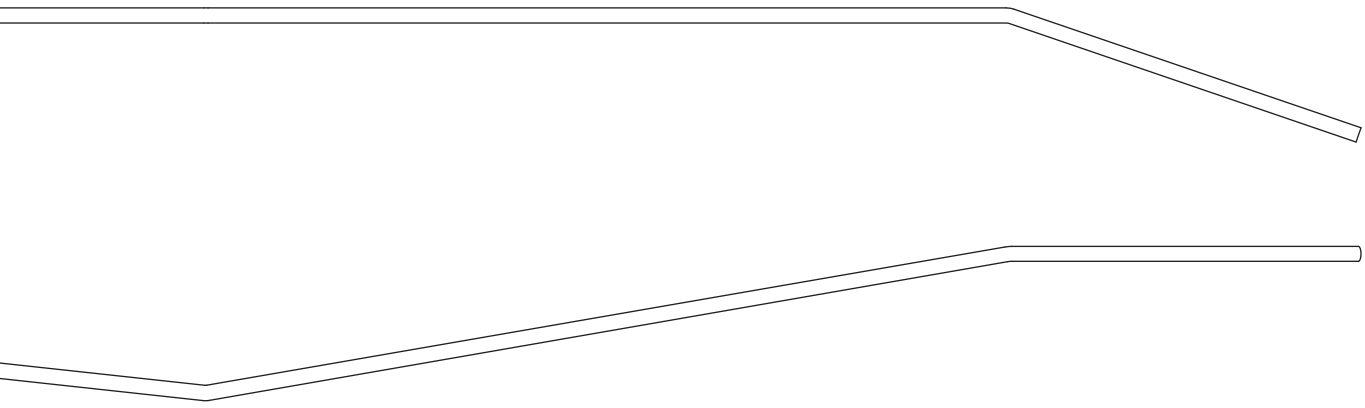
Address

City, State, Zip

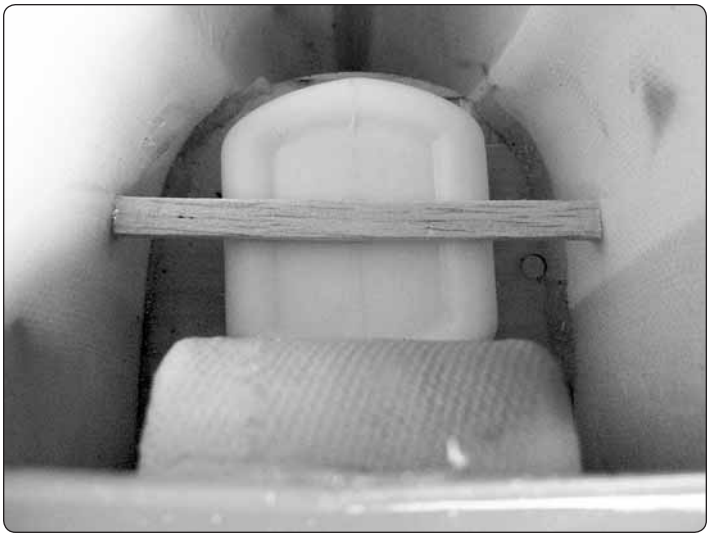
Phone Number

AMA Number

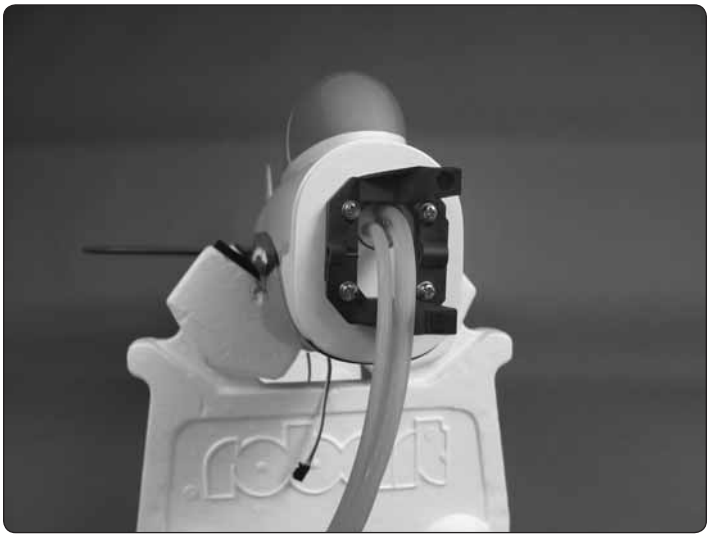
G PUSHROD TEMPLATE



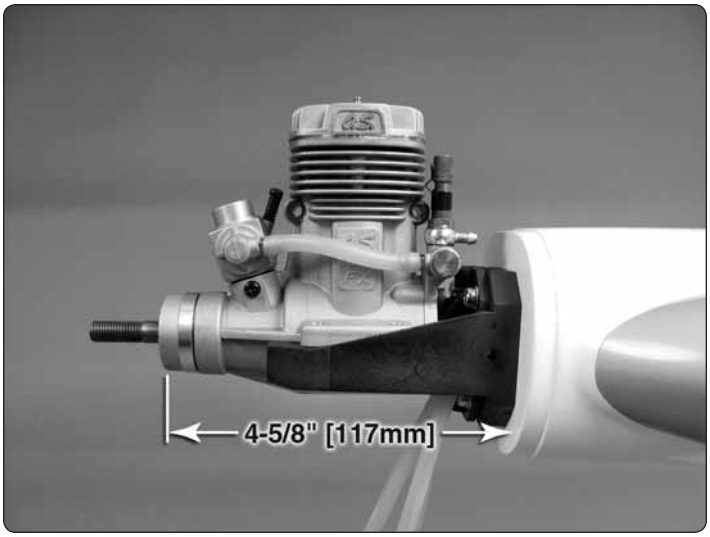
Carefully remove this insert, in order to use your full size templates on the reverse side.

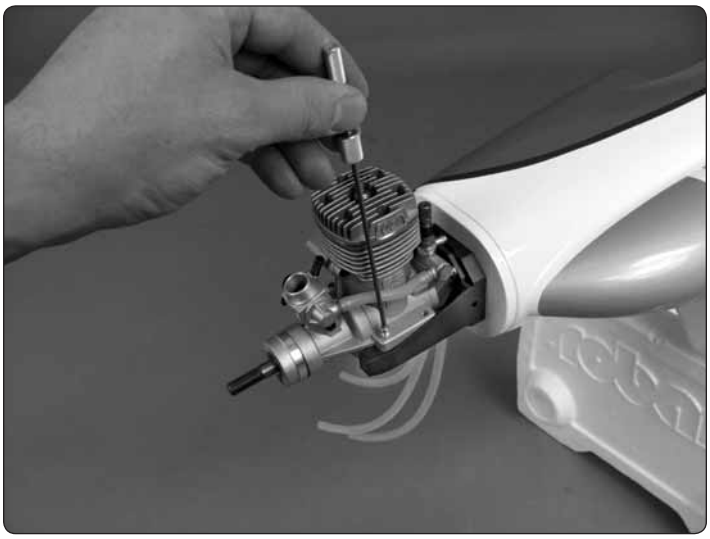


❏ 5. Cut a 3-1/2" [89mm] piece from the included 1/4" x 1/4" x 11-3/4" [6 x 6 x 300 mm] balsa stick that fits behind the fuel tank between the fuse sides. Test fit the piece and gradually reduce its length until it fits snugly (be sure that the stick does not cause the sides of the fuselage to bow outward). When satisfied with the length of the stick, securely glue it in place behind the fuel tank to secure it.



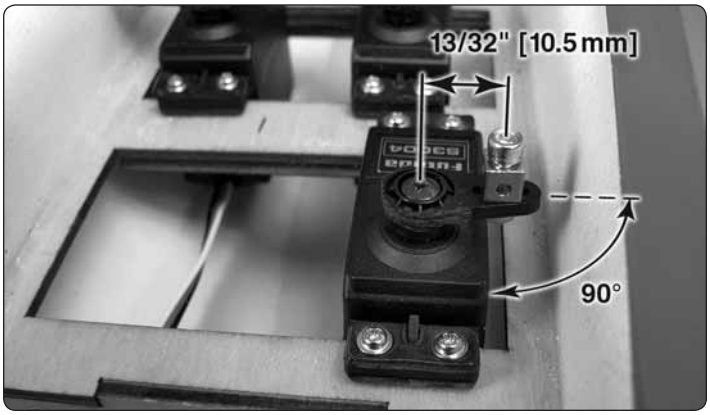
❏ 6. Connect a 6-7" [152-178mm] piece of standard fuel tubing to each tube protruding from the fuel tank.



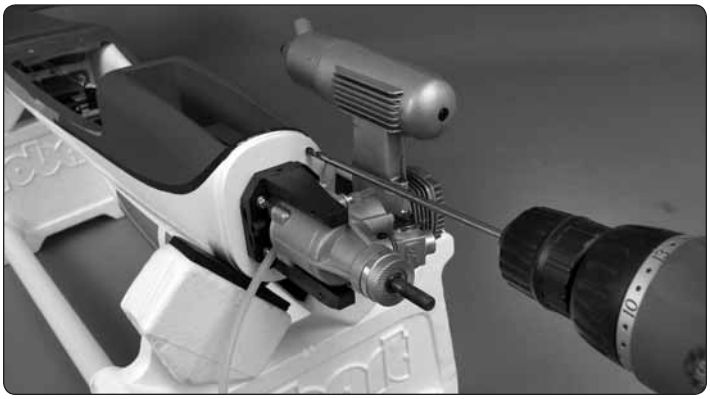


❏ 7. Position the front of the engine drive washer 4-5/8" [117mm] from the front of the firewall. Mark the location of the engine mount holes onto the mount rails using a Dead Center Hole Locator. Remove the engine from the mount and use a 6-32 tap and drill set to create threads in the four mounting holes. Attach the engine to the mount using four 6-32 x 3/4" [19mm] screws, four #6 flat washers and four #6 lock washers.

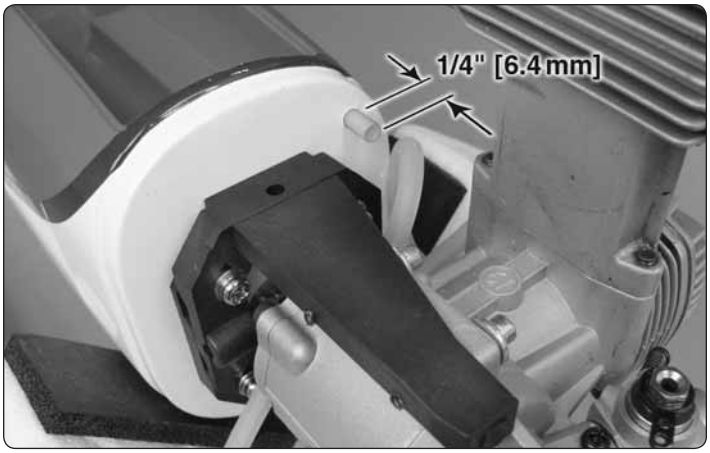
❏ 8. Install your muffler onto the engine. Cut the fuel tubing coming from the tank to the proper length and connect the pressure and carb lines to the muffler and fuel inlet. The fill line (if installed) should be plugged with the included fuel line plug.



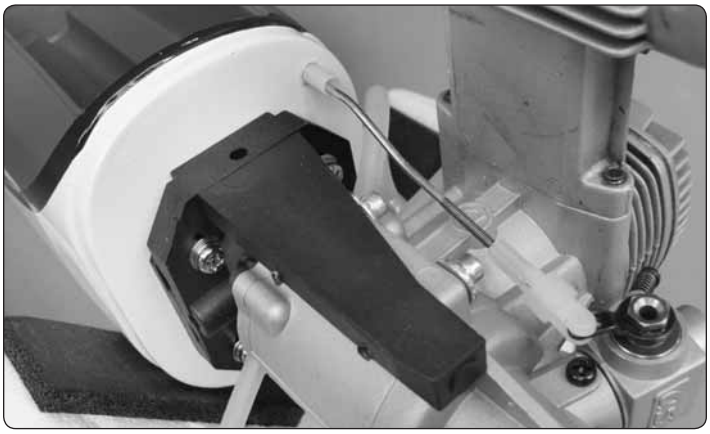
❏ 9. Cut four arms from a five-armed servo arm included with your throttle servo. Center the servo with your radio system (50% throttle stick position on transmitter) and install the arm perpendicular with the servo case as shown. Install a screw-lock pushrod connector into the middle hole in the remaining arm and secure it in place with a nylon screw-lock connector retainer. Loosely install a 4-40 x 1/8" [3.2mm] SHCS into the screw-lock pushrod connector. Install the throttle servo onto the throttle servo tray using the hardware supplied with the servo.

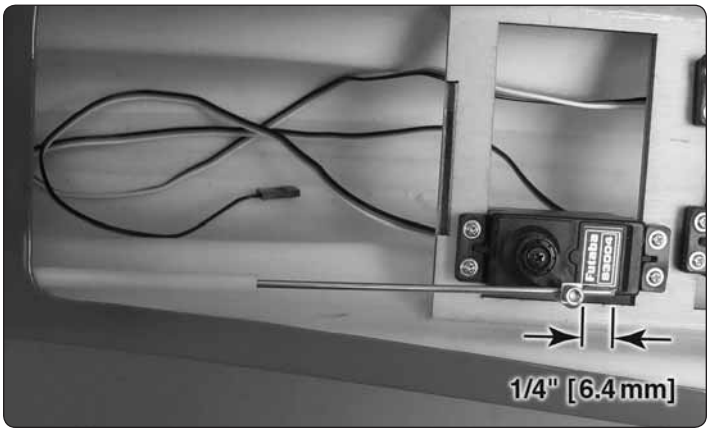


❏ 10. Drill a 3/16" [4.8mm] hole in the firewall inline with the throttle arm on the carburetor. An extra long drill bit is very useful for this step (drill bit shown is stock number HIGR1020). Be sure that the hole you drill does not pass into the wheel well on the underside of the fuselage for a retractable nose gear. Align the drill bit so the throttle pushrod will be positioned in the space between this wheel well and the fuse side.



❏ 11. Use sandpaper to roughen the forward end of the 3/16" [4.8mm] outer pushrod tube. Clean that end with denatured alcohol and insert it into the hole you drilled in the firewall. The forward end should protrude from the firewall approximately 1/4" [6.4 mm]. Glue the tube into the firewall.



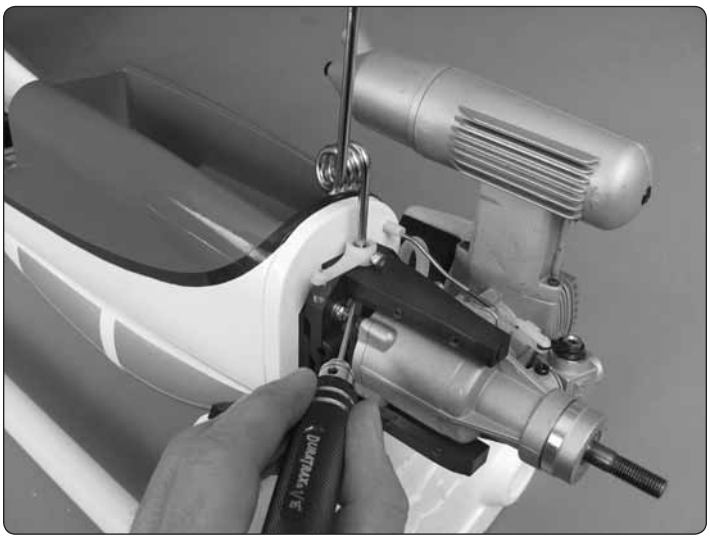


❏ 12. Thread a nylon clevis (20 turns) and silicone clevis retainer onto a 2-56 x 17-1/2" [445mm] pushrod. Insert the pushrod into the outer pushrod tube and through the screw-lock connector on the throttle servo arm. It will be necessary to make a couple of shallow bends near the clevis so it can attach to the throttle arm on the carburetor without binding. Position the pushrod in the screw-lock connector so that the full travel of the throttle servo using the transmitter will properly open and close the carburetor. When satisfied, thoroughly tighten the SHCS in the screw-lock connector with thread locking compound. The excess pushrod 1/4" [6.4mm] aft of the screw-lock connector can be cut off.

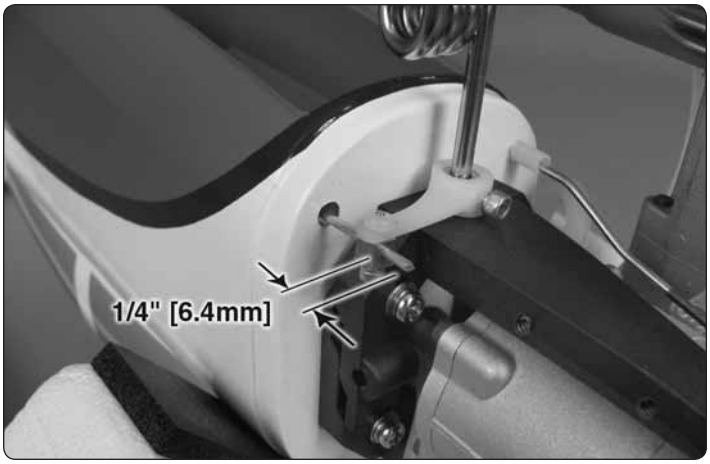
INSTALL THE FIXED NOSE GEAR

If you will be installing a mechanical or pneumatic nose gear retract, skip this section.

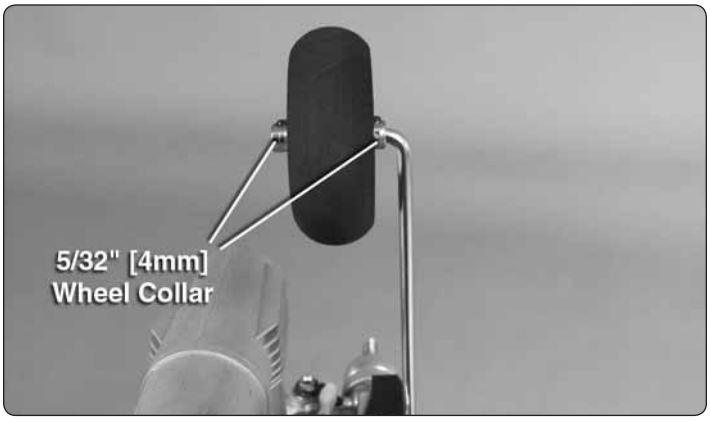
❏ 1. Fit a 5/32" [4mm] wheel collar into the nylon steering arm aligning the threaded hole in the collar with the hole in the arm. Loosely thread a 6-32 x 1/4" [6.4mm] SHCS into the collar. Cut off the outer hole from the steering arm. Install a screw-lock connector into the outermost remaining hole using a nylon retainer. Loosely thread a 4-40 x 1/8" [3mm] SHCS into the screw-lock connector.



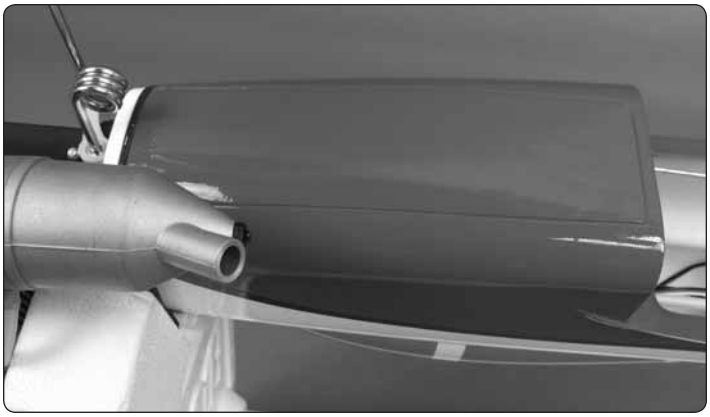
❏ 2. Slide the steering arm onto the nose gear wire. Apply a drop or two of oil to the nose gear wire hole in the engine mount. Insert the nose gear into the hole and position the two flat spots so there is one evenly spaced on each side of the engine mount rail. Loosely thread a 6-32 set screw into a 5/32" [4mm] wheel collar with thread locking compound. Fit the wheel collar and set screw onto your hex driver (or allen key) and slide the collar onto the end of the nose gear wire as shown. Tighten the set screw against the flat spot on the wire. Tighten the SHCS in the steering arm against the other flat spot. Ensure that the nose gear rotates freely inside the engine mount hole and doesn't move up and down.



❏ 3. Drill a 3/16" [4.8mm] hole in the firewall inline with the screw-lock connector installed on the steering arm. Cut off the threads from a 2-56 x 24" [610mm] pushrod. Slide the pushrod through the screw-lock connector, through the hole in the firewall and up to the rudder servo. Make a 90 degree bend at the aft end of the pushrod and connect it to the second inner hole of the rudder servo arm. Secure it with a nylon FasLink. With the rudder centered, straighten the nose gear axle and tighten the SHCS in the screw-lock connector. Cut off the excess pushrod 1/4" [6.4mm] forward of the screw-lock connector.



❏ 4. Install the nose wheel using two 5/32" [4mm] wheel collars and two 6-32 set screws. As you did with the main gear, grind flat spots on the axle for the screws. Use thread locking compound when tightening the screws and a drop of oil on the axle for the wheel.

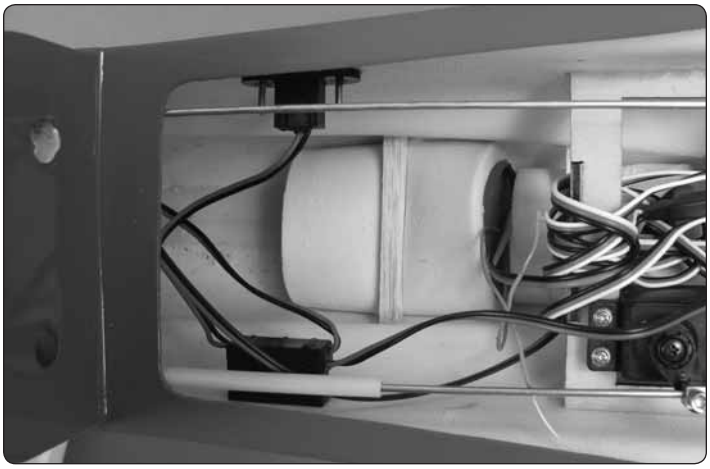


❏ 5. If you plan to install retracts later, glue the retractable nose gear wheel well cover in place using several dots of medium or thick CA glue around the perimeter. Otherwise, thoroughly glue the cover in place.

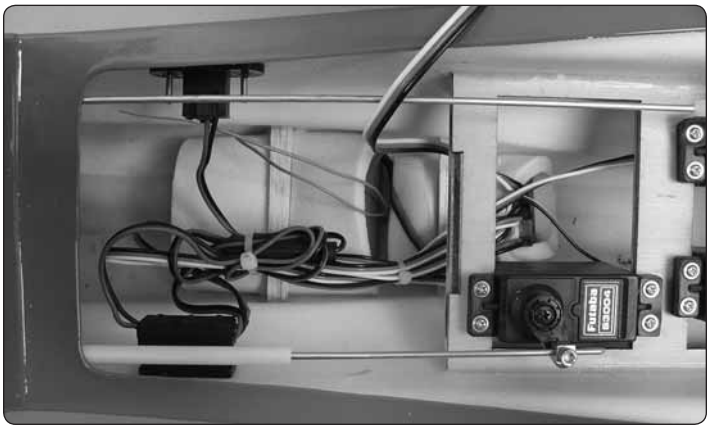
INSTALL THE ELECTRONICS

❏ 1. Install the receiver switch and optional charge jack receptacle onto the sides of the fuselage. If space allows, install the switch and charge jack on the side opposite the muffler.

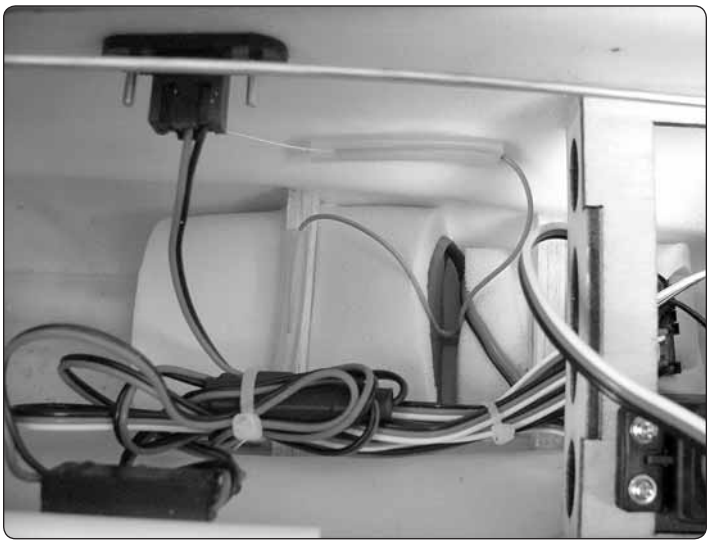
❏ 2. Connect your servos and switch to the receiver. If you plan to connect the aileron servos to one channel on your receiver, connect a Y-harness to the aileron channel on your receiver. Otherwise, connect servo extensions to the channels you will mix together for the ailerons. Wrap your receiver in 1/4" [6.4mm] foam rubber (not included). Fit the receiver into the cavity in the fuselage above the servo tray. Cut a piece from the included balsa stick and glue it between the fuse sides against the receiver to secure it in place.



❏ 3. Mount your receiver pack in front of the receiver in the same way.



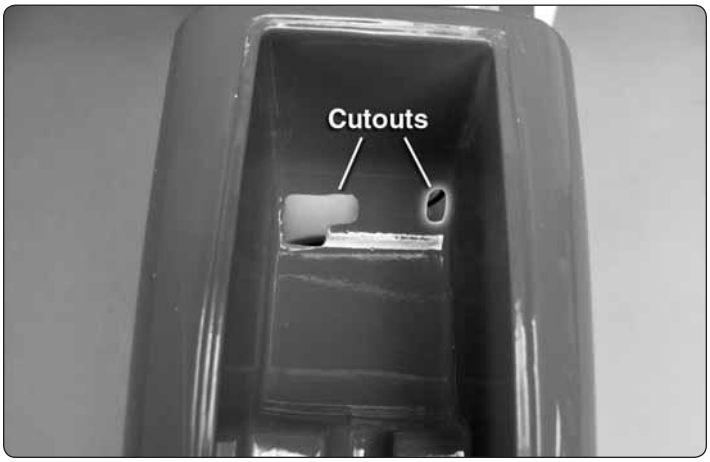
❏ 4. Use tie straps or something similar to bundle the servo wires out of the way of the pushrods and servos.



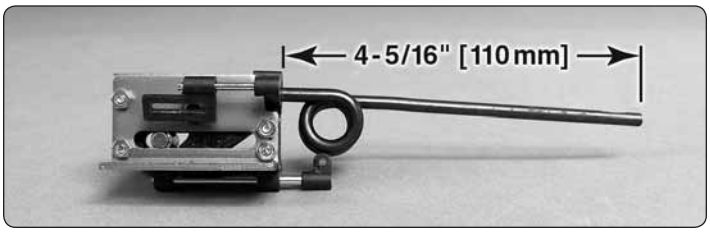
❏ 5. If you have installed a 2.4GHz receiver, scrap pieces of fuel tubing can be used to support the dual receiver antennas in the orientation described in your radio manual. If you have installed an FM receiver, route the antenna into the antenna tube.

INSTALL THE OPTIONAL MECHANICAL NOSE GEAR RETRACT

If you have already installed the fixed nose gear, skip this section.



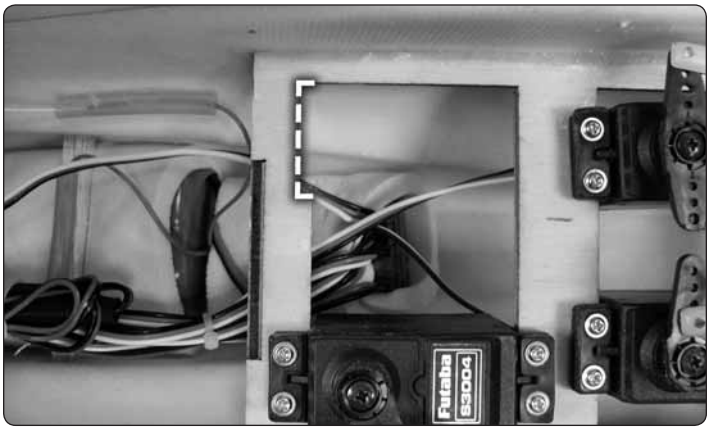
❏ 1. Use a rotary tool with a fine straight cutting bit (a hobby knife could be used but is not the recommended tool) to make elongated holes in the positions shown in the photo. Notice that the holes are centered in the curve of the wheel well. As you install your pushrods in later steps, these holes may need to lengthened or widened to accommodate the pushrods.



❏ 2. Cut the nose gear strut using the dimensions shown. A rotary tool with a cut off wheel is recommended for shortening the strut.

❏ 3. Position the retract onto the rails in the retract well as far forward as it will go. Temporarily slide the axle shown in step 11 onto the end of the gear strut to ensure the nose wheel will be centered in the wheel well. Center the retract between the rails and use a felt-tip pen to mark the mounting hole locations.

❏ 4. Drill 3/32" [2.4mm] holes at the marks you made. Thread a #4 x 1/2" [13mm] self-tapping screw into each hole and back it out. Apply a drop of thin CA to the holes and allow the glue to harden. Install the retract using four #4 x 1/2" [13mm] self-tapping screws.

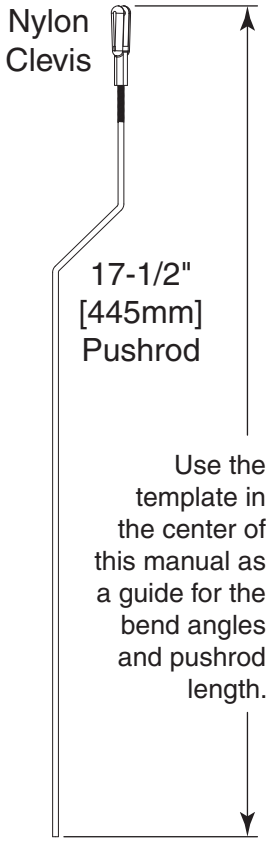


❏ 5. If you are using the recommended retract servo, the servo tray will need to be enlarged as shown. Measure your servo, draw the desired cut lines onto the tray and make your cuts using a rotary tool or a hobby knife. Wrap a piece of sandpaper around a flat, scrap piece of wood and finish sand the edges for a professional looking modification.

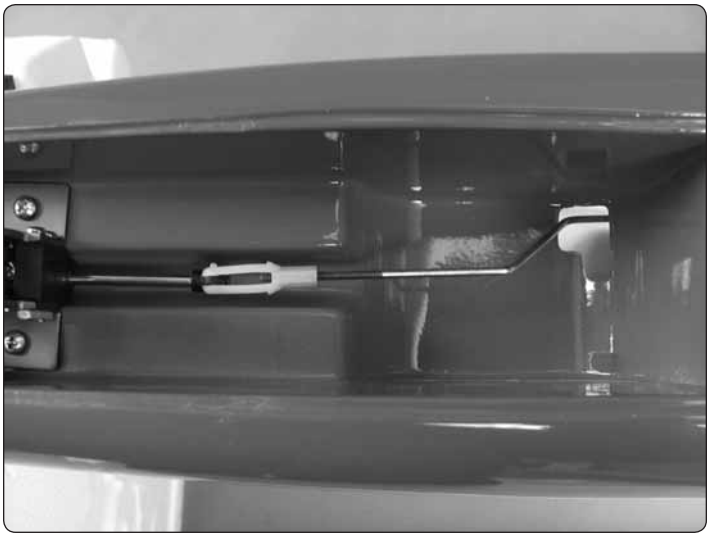
❏ 6. Install the retract servo using the hardware included with the servo. Be sure to harden the servo mounting holes with thin CA.

❏ 7. Choose a retract servo arm that has a hole 1/2" [13mm] from the servo arm center. Determine the best orientation of the servo arm onto the servo spline so that it is parallel with the length of the servo case as shown in the photo of the next step. Install a screw lock connector using a screw lock connector retainer into the hole that is 1/2" [13mm] from the servo arm center of the chosen arm. Loosely thread a 4-40 x 1/8" [3mm] SHCS into the connector. The remaining servo arms can be cut off.

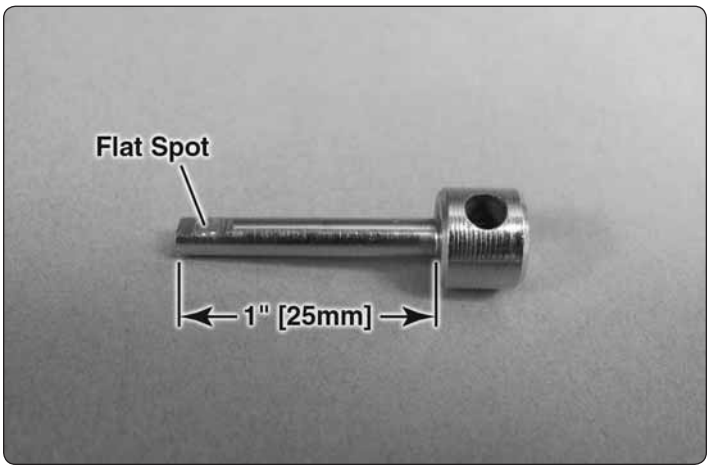
❏ 8. Install the servo arm onto the retract servo as shown.



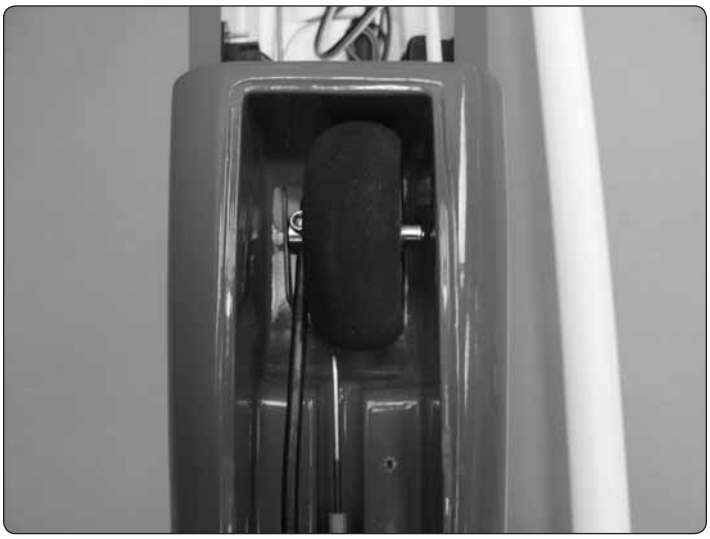
❏ 9. Make the mechanical nose gear actuator pushrod by threading a nylon clevis 20 turns onto a 17-1/2" [445mm] pushrod, bending the pushrod to clear the nose wheel. Use the mechanical nose gear actuator pushrod template in this manual as a guide for the bend angles and pushrod length.



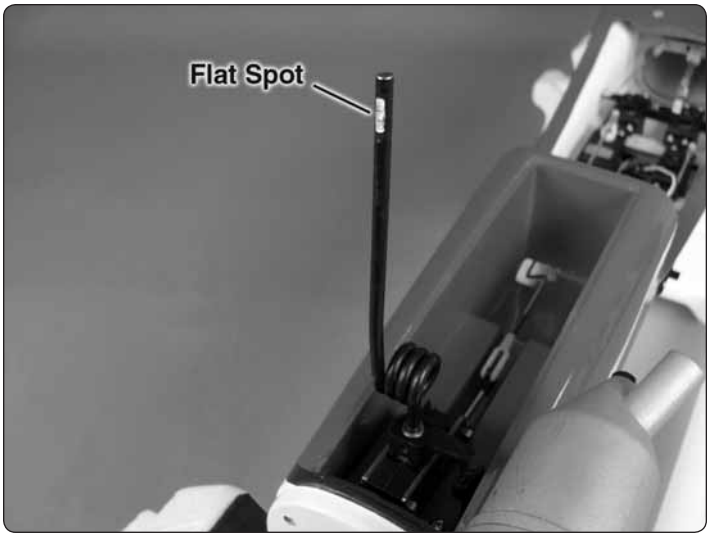
❏ 10. Insert the pushrod through the hole you made in the wheel well. Connect the clevis on the pushrod to the actuator link on the nose gear retract and the other end to the screw lock connector on the retract servo. Test the operation of the retract servo using your radio system. Be sure that the retract locks both in the up and down position. Make any adjustments as necessary.



❏ 11. Cut the included 5/32" x 1-1/4" [4mm x 32mm] bolt-on axle to 1" [25mm] long as shown in the photo. Grind a flat spot at the end of the axle for the wheel collar set screw.

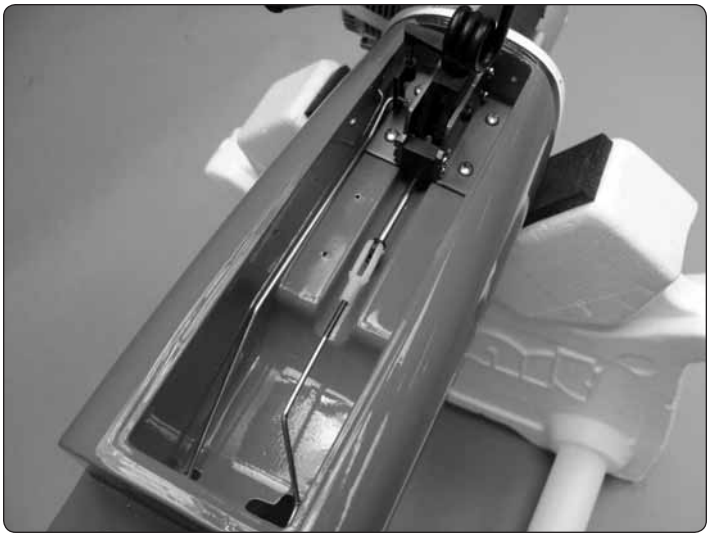


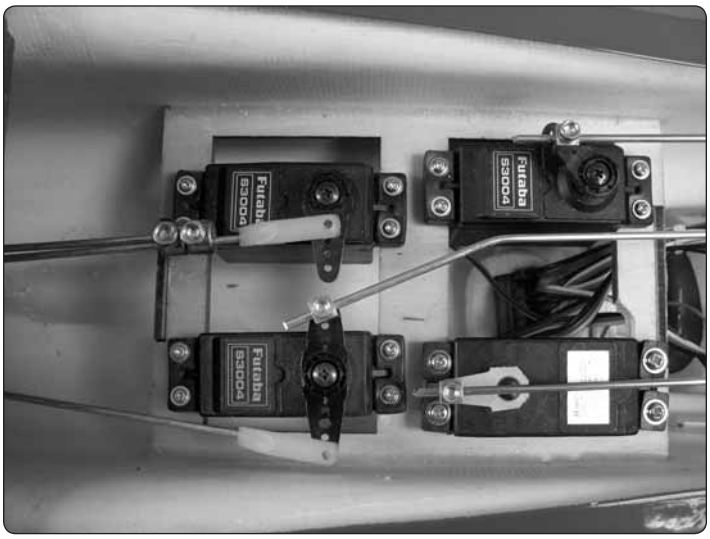
❏ 12. Slide a wheel onto the axle and secure it with a 5/32" [4mm] wheel collar, 6-32 set screw and thread locking compound. A drop or two of oil on the axle will ensure that the wheel rotates freely. Loosely thread a 6-32 x 1/4" [6.4mm] SHCS into the axle. Slide the axle onto the end of the nose gear strut and move the retract to the locked up position. Position the axle on the strut so that the wheel is as far aft as possible but still moves up and down without contacting the fuselage. Tighten the SHCS in the axle just tight enough to hold the axle in place on the strut. Move the retract to the down position. Rotate the axle on the wire so the nose wheel will point straight ahead with the nose gear strut pointing straight ahead (use the steering arm on the nose gear as a reference). Thoroughly tighten the SHCS in the axle.



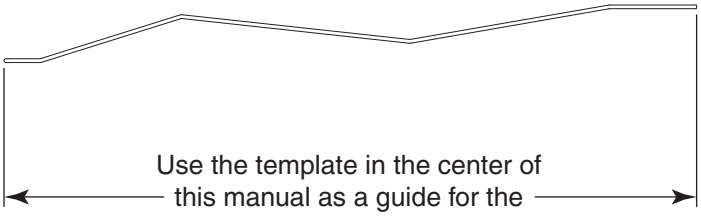
❏ 13. Remove the axle from the nose gear strut. A mark will be left on the strut from tightening the SHCS in the previous step. Grind a flat spot at the mark. Reinstall the axle onto the strut and tighten the SHCS against the flat spot with thread locking compound.

❏ 14. Install a screw lock connector into the outer hole of the remaining rudder servo arm. Loosely thread a 4-40 x 1/8" [3mm] SHCS into the screw lock connector.



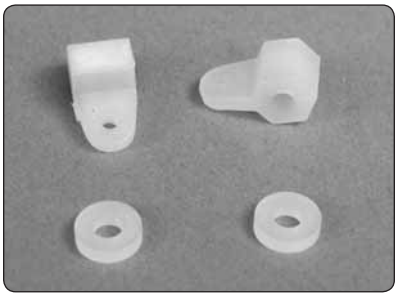


24" [610mm] Pushrod

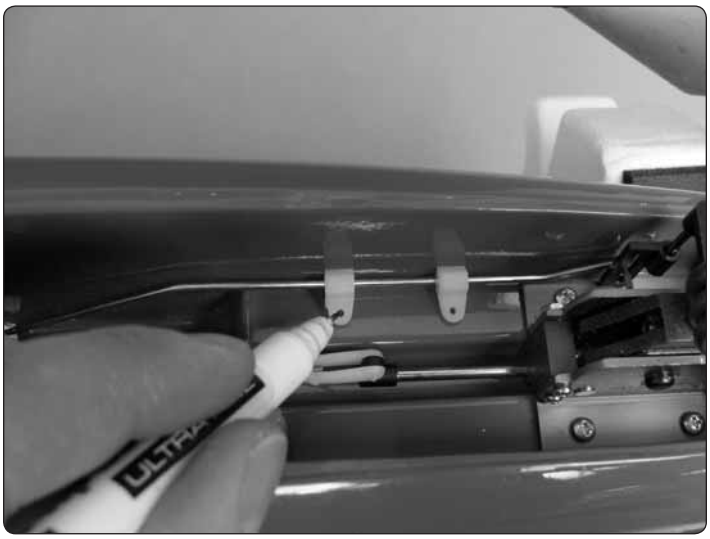


Use the template in the center of this manual as a guide for the bend angles and pushrod length.

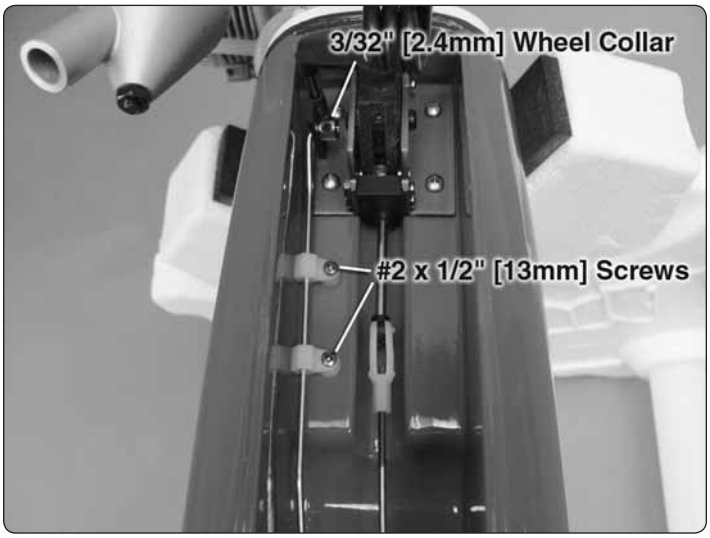
❏ 15. A mechanical/pneumatic nose gear steering pushrod template is provided at the back of this manual. Use a 24" [610mm] pushrod to make the steering pushrod. The threaded end will not be used. Insert the pushrod through the other hole you made in the wheel well. The short bend in the pushrod fits into the slotted link on the retract. The other end fits into the screw lock connector on the rudder steering servo arm. Test the operation of the steering with your radio system. Adjust the bends in the pushrod as necessary for bind free operation.



❏ 16. Locate the two small nylon disks and two nylon torque rod horns as shown. These parts will be used as steering pushrod guides.



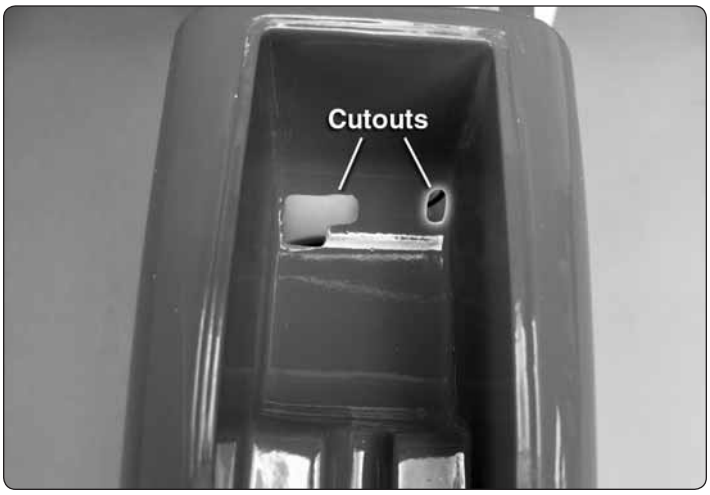
❏ 17. Remove the steering pushrod from the fuselage. Slide the torque rod horns onto the pushrod and reinstall the pushrod in the fuselage. Space them evenly apart as shown and mark the positions of the mounting holes onto the retract rail.



❏ 18. Drill 1/16" [1.6mm] holes at the marks you made. Thread a #2 x 1/2" [13mm] self-tapping screw into each hole and back it out. Apply a drop of thin CA to each hole and let the glue harden. Align a nylon disk over each hole (a drop of CA will hold them in place). Attach the torque rod horns using two #2 x 1/2" [13mm] self-tapping screws. Secure the forward end of the pushrod to the steering link on the retract with a 3/32" [2.4mm] wheel collar and a 4-40 set screw. Do one final test of the retract using your radio.

INSTALL THE OPTIONAL PNEUMATIC NOSE GEAR RETRACT AND AIR CONTROL SYSTEM

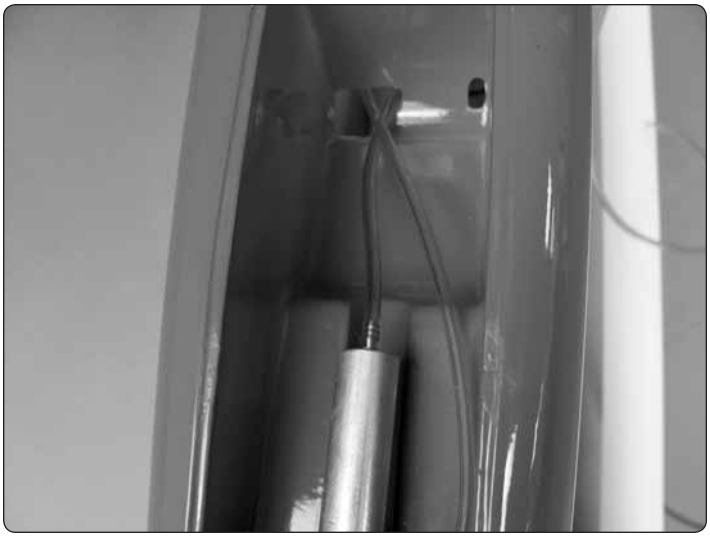
Skip this section if you have already installed the fixed or mechanical landing gear.



❏ 1. Use a rotary tool with a fine straight cutting bit (a hobby knife could be used but is not the recommended tool) to make elongated holes in the positions shown in the photo. Notice that the holes are centered in the curve of the wheel well. As you install your steering pushrod in later steps, that hole may need to lengthened as necessary. The other hole is for routing the air lines into the fuselage.

❏ 2. Cut the nose gear strut using the dimensions shown. A rotary tool with a cut off wheel is recommended for shortening the strut.

❏ 3. Position the retract onto the rails in the retract well as far forward as it will go. Use a felt-tip pen to mark the mounting hole locations.

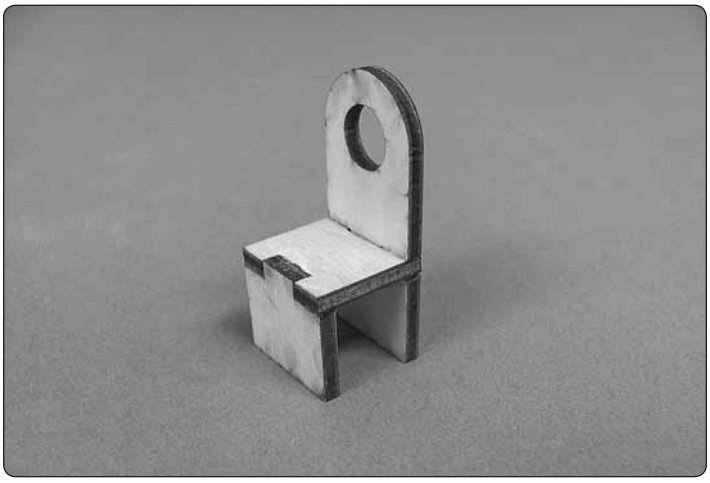


❏ 4. Drill 3/32" [2.4mm] holes at the marks you made. Thread a #4 x 1/2" [13mm] self-tapping screw into each hole and back it out. Apply a drop of thin CA to the holes and allow the glue to harden. Connect the remainder of your air lines to the nose gear retract (these lines will be cut to length later). Route the lines through the hole you made in step #1. Install the retract using four #4 x 1/2" [13mm] self-tapping screws.

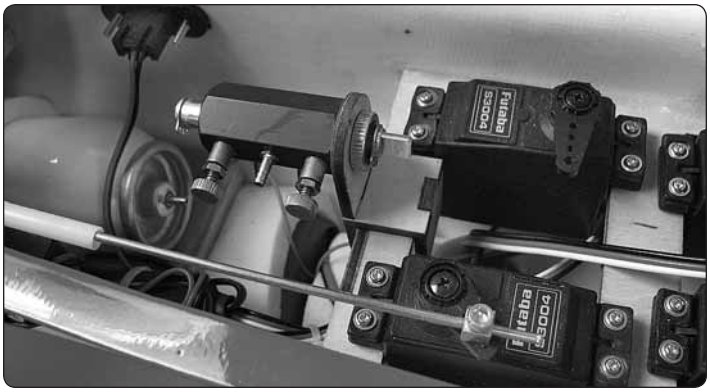
❏ 5. Wrap your air tank with a generous amount of 1/4" [6.4mm] foam rubber (not included). The foam rubber should completely wrap around the bottom of the tank.

❏ 6. Insert the air tank into the nose of the fuselage, pushing it as far forward as it will go. Cut a piece of scrap balsa to secure the tank in place as shown.

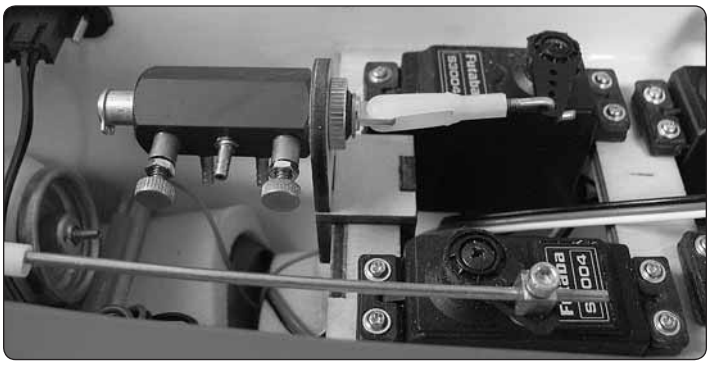
❏ 7. Install your retract valve servo in the location shown. Cut three arms from a four-armed servo arm and install it perpendicular to the servo case. Enlarge the outer hole of the remaining arm with a 5/64" [2mm] drill bit.



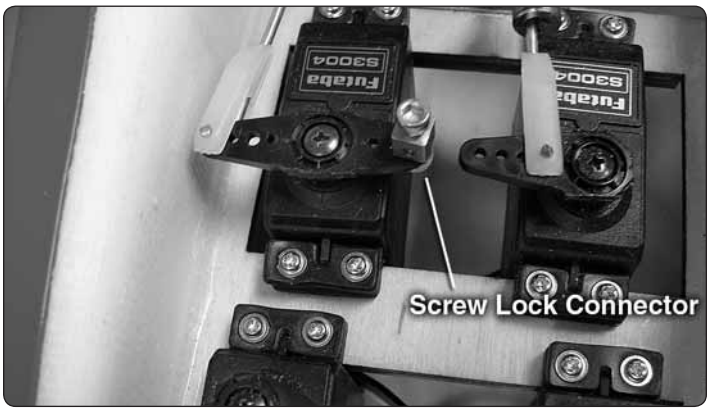
❏ 8. Assemble the plywood air valve mount.



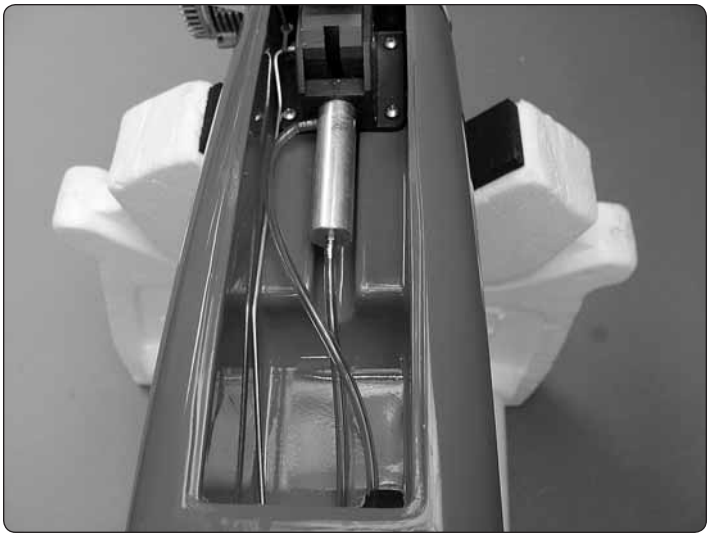
❏ 9. Insert the threaded end of the air valve through the hole in the mount. Apply a few drops of thread locking compound and tighten the valve against the mount using the knurled nut. Rotate the valve so the adjustment needles will be on their side when installed in the fuselage. This will prevent them from interfering with the wing. Use a pair of pliers to snug down the knurled nut. Use thick CA or epoxy to glue the valve mount to the servo tray in the location shown.



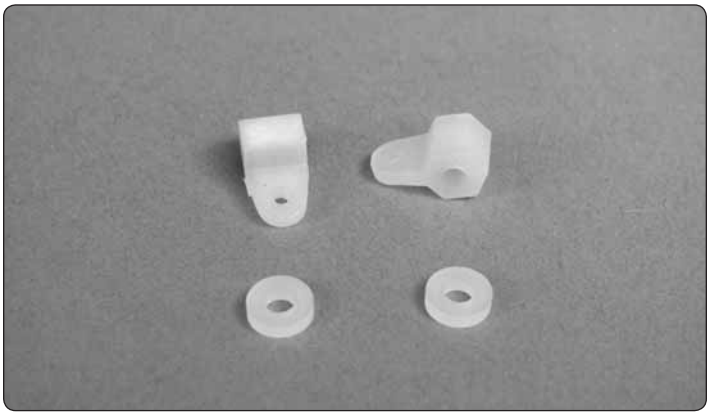
❏ 10. Make an actuator pushrod from the included 12" [305mm] pushrod by cutting off approximately half of the threads at one end and make a Z-bend at the other. Thread a nylon clevis onto the threaded end of the pushrod and attach the clevis to the valve. **CAUTION:** You will need to reduce the travel of your actuator servo to approximately 20% of full travel in each direction. Test the operation of the servo using your radio system before connecting it to the pushrod. Excessive travel of the actuator servo when connected to the valve may break the valve mount.



❏ 11. Install a screw lock connector into the outer hole of the remaining rudder servo arm. Loosely thread a 4-40 x 1/8" [3mm] SHCS into the screw lock connector.

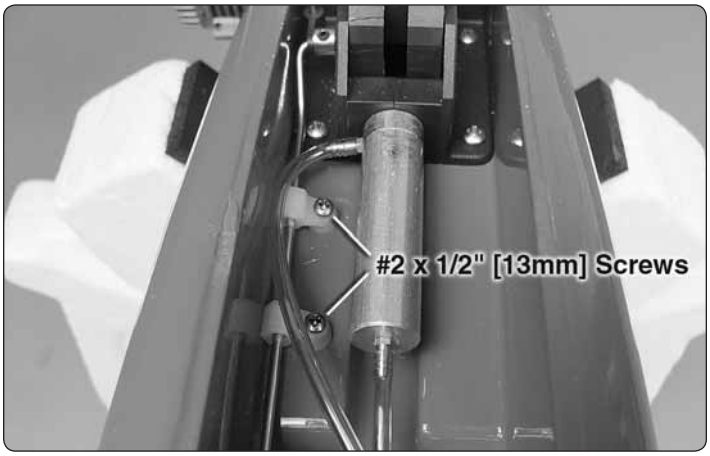


❏ 12. A mechanical/pneumatic nose gear steering pushrod template is provided at the back of this manual. Use a 17-1/2" [445mm] pushrod to make the steering pushrod. The threaded end will not be used. Insert the pushrod through the other hole you made in the wheel well. The short bend in the pushrod fits into the link on the retract steering arm (you will need to enlarge the hole in the link to 5/64" [2mm]). The other end fits into the screw lock connector on the rudder steering servo arm. Test the operation of the steering with your radio system. Adjust the pushrod as necessary for bind free operation.



❏ 13. Locate the two small nylon disks and two nylon torque rod horns as shown. These parts will be used as steering pushrod guides.

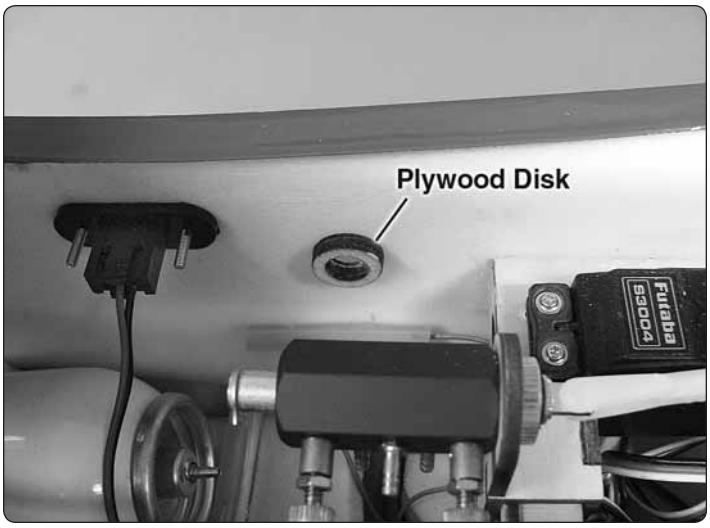
❏ 14. Remove the steering pushrod from the fuselage. Slide the torque rod horns onto the pushrod and reinstall the pushrod in the fuselage. Space them evenly apart as shown and mark the positions of the mounting holes onto the retract rail.



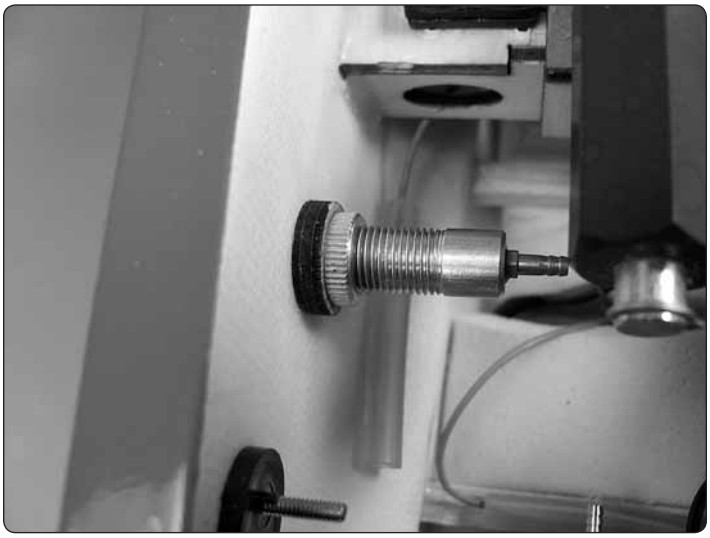
❏ 15. Drill 1/16" [1.6mm] holes at the marks you made. Thread a #2 x 1/2" [13mm] self-tapping screw into each hole and back it out. Apply a drop of thin CA to each hole and let the glue harden. Align a nylon disk over each hole (a drop of CA will hold them in place). Attach the torque rod horns using two #2 x 1/2" [13mm] self-tapping screws. Secure the forward end of the pushrod to the steering link on the retract with a 3/32" [2.4mm] wheel collar and a 4-40 set screw. Test the operation of the steering again with your radio system and make any necessary adjustments.

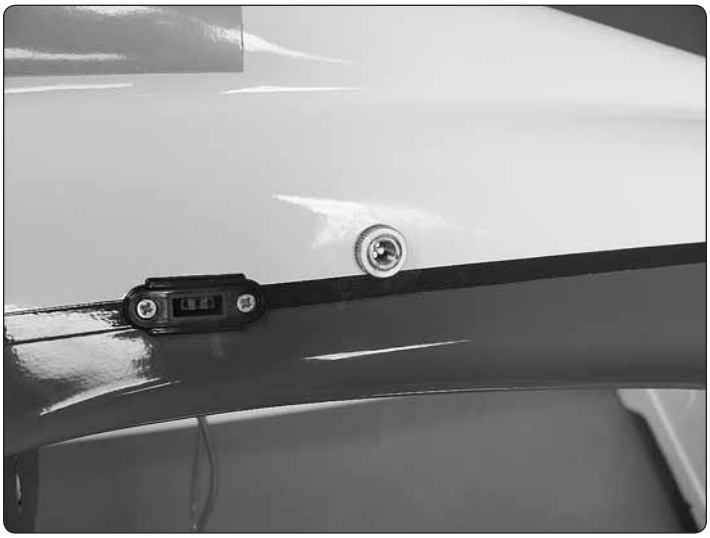
❏ 16. Choose a location for the fill valve on the side of the fuselage. The location should be out of the way of servos and the other retract hardware. Drill a small hole at your chosen

location and enlarge the hole to the diameter of the fill valve using a drill bit or a reaming tool (recommended method).

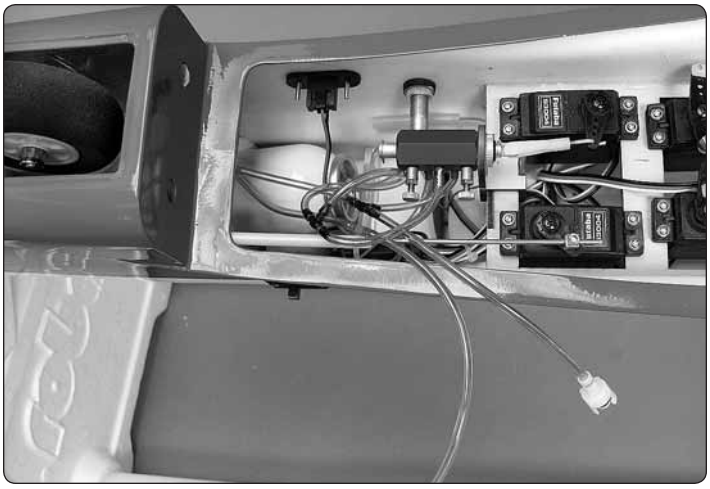


❏ 17. Sand the inside of the fuselage around the hole you just made. Clean the area using denatured alcohol. Glue the included plywood disk over the hole on the inside of the fuselage.

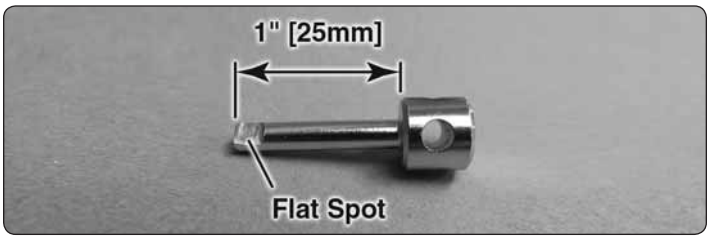




❏ 18. Insert the fill valve through the hole and secure it in place using the jam nuts and thread locking compound.



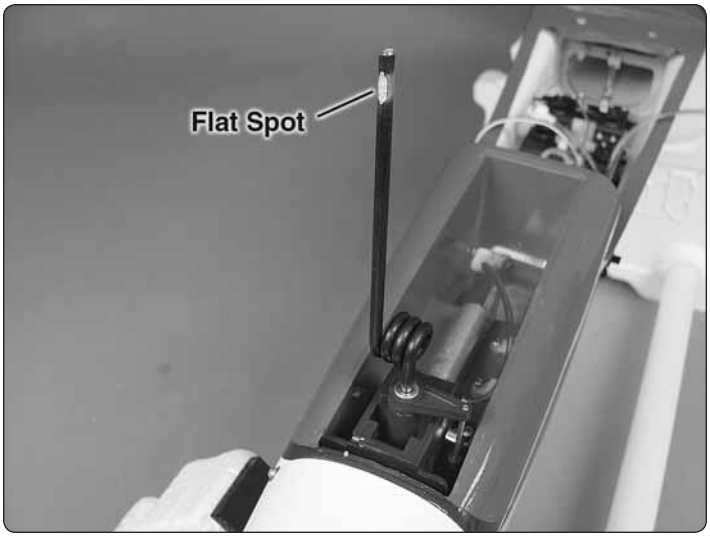
❏ 19. Connect the remainder of the air lines to the air tank, fill valve and air valve. T-fittings will also be needed to join the components together (see the instructions that came with your retracts). Attach quick disconnects to the lines that will connect to the main gear.



❏ 20. Cut the included 5/32" x 1-1/4" [4mm x 32mm] bolt-on axle to 1" [25mm] long as shown in the photo. Grind a flat spot at the end of the axle for the wheel collar set screw.

❏ 21. Slide a wheel onto the axle and secure it with a 5/32" [4mm] wheel collar, 6-32 set screw and thread locking compound. A drop or two of oil on the axle will ensure that the wheel rotates freely. Loosely thread a 6-32 x 1/4" [6mm] SHCS into the axle. Slide the axle onto the end of the nose gear strut and move the retract to the locked up position. Position the axle on the strut so that the wheel is as far aft as possible but still moves up and down without contacting the fuselage. Tighten the SHCS in the axle just tight enough to hold the axle in place on the strut. Move the retract to the down position. Rotate the axle on the wire so the nose wheel will

point straight ahead with the nose gear strut pointing straight ahead (use the steering arm on the nose gear as a reference). Thoroughly tighten the SHCS in the axle.



❏ 22. Remove the axle from the nose gear strut. A mark will be left on the strut from tightening the SHCS in the previous step. Grind a flat spot at the mark. Reinstall the axle onto the strut and tighten the SHCS against the flat spot with thread locking compound.

OPTIONAL TUNED PIPE INSTALLATION

If using the recommended engine and tuned pipe components, the tuned pipe system will need to be tuned for the engine before installation is complete. Detailed directions for tuning the header length can be found at www.macspro.com.

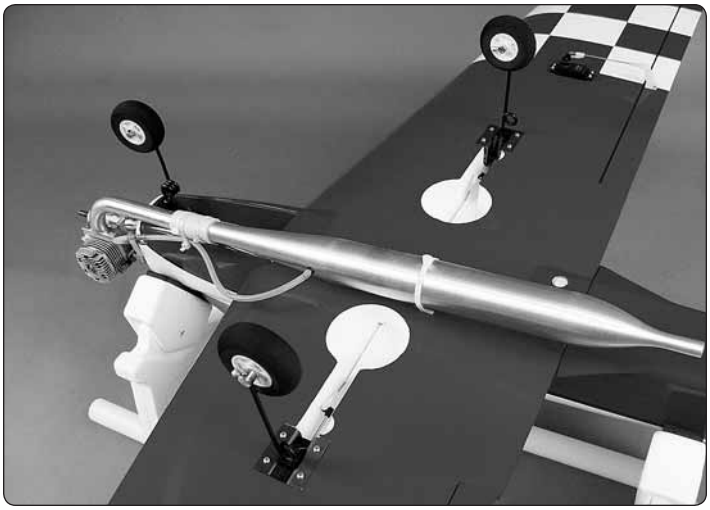
❏ 1. Prepare your pipe by installing the pressure nipple as described in the directions with the system (if no instructions are included for installing the nipple, visit the website of the tuned pipe manufacturer). Mount the header to the engine, join the pipe to the header with a silicone coupler and use tie-straps to secure it (if you have not yet tuned the system, do not install the tie straps on the coupler yet). Because the pipe is mounted directly to the wing, we chose to use an in-line connector (DUBC2371) on the pressure line to make disconnecting the line easier. When the wing is removed, you can leave the pipe attached and simply slide the pipe out of the coupler and disconnect the pressure line. Another option is keep a supply of tie-straps in your field box and replace the strap holding the pipe to the wing whenever you wish to remove the wing from the fuselage.

❏ 2. With the pipe now connected to the header, locate the plywood plate installed in the wing. If you cannot see it, look across the underside of the wing at a shallow angle to locate the edges of the plate beneath the covering.

❏ 3. Mark the desired location of the pipe mount onto the wing, being sure it is on the plywood plate. Also, be sure the position of the mount will not cause the tuned pipe to interfere with the removal of the wing bolts.

❏ 4. Drill a hole of the appropriate size for the screw included with the pipe mount (7/64" [2.8mm] recommended for the screw included with the Macs tuned pipe mount). Thread the

screw into the hole and back it out. Apply a couple drops of thin CA to the hole and allow the glue the harden. Install the mount to the wing and apply the adhesive foam pad (included with the pipe mount) to the mount.

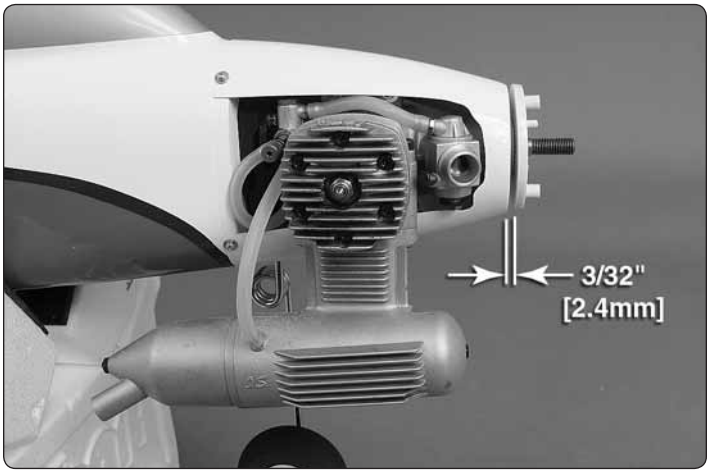


❏ 5. Use the tie strap included with the pipe mount to secure the pipe. Be sure the strap is drawn tightly around the pipe.

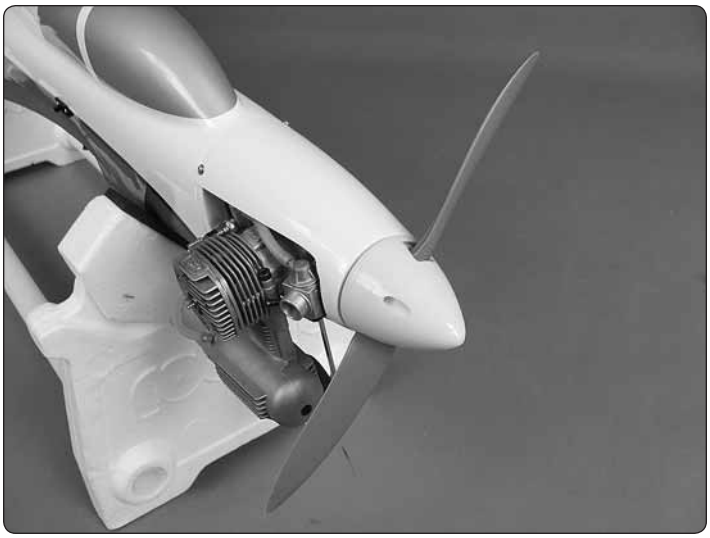
❏ 6. Be sure to install tie straps around the coupler after you have tuned the system, if you have not done so already.

FINISH THE MODEL

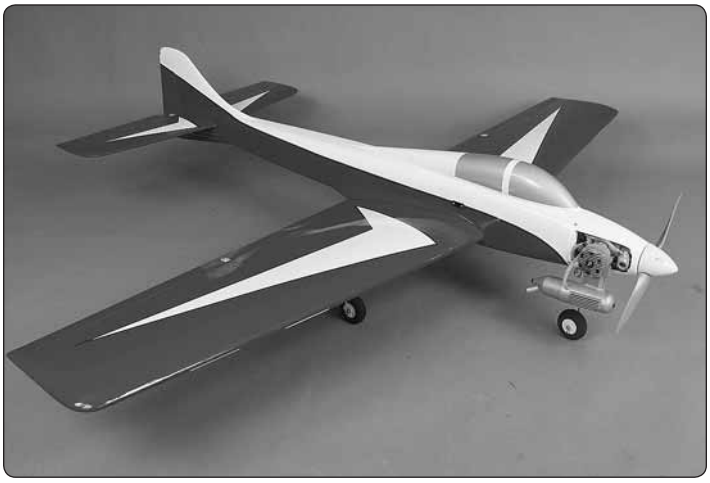
❏ 1. Make a cutout in the cowl to fit around the engine and muffler. You can make a template for the necessary cutout, or you could slowly enlarge the cutout as necessary while test fitting the cowl onto the fuselage after each cut until you are satisfied with the cowl fit.



❏ 2. Fit the cowl to the fuselage. If necessary, enlarge the hole in the spinner backplate to accommodate your engine crankshaft. Slide the backplate onto the engine crankshaft. Position the front of the cowl approximately 3/32" [2.4mm] behind the spinner backplate also while centering it. Temporarily tape the cowl into position. Drill four 1/16" [1.6mm] holes evenly spaced around the cowl perimeter for the cowl mounting screws. The holes should be carefully drilled through the aft end of the cowl and into the firewall (take care not to drill into the steering or throttle pushrods). Remove the cowl and enlarge the holes in the cowl to 5/64" [2mm]. Thread a #2 x 3/8" [9.5mm] self-tapping screw into each hole and back it out. Apply a drop of thin CA to each hole and allow it to fully harden. Install the cowl using four #2 x 3/8" [9.5mm] self-tapping screws and four #2 flat washers.



❏ 3. Install the propeller, prop washer, and prop nut. Enlarge the prop cutouts in the spinner cone if necessary. Install the spinner cone using the included spinner screws.



❏ 4. That completes assembly of the Dirty Birdy ARF!

Apply the Decals

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

❏ 2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water—about one teaspoon of

soap per gallon of water. Submerse the decal in the soap and water and peel off the paper backing. **Note:** Even though the decals have a "sticky-back" and are not the water transfer type, submersing them in soap & water allows accurate positioning and reduces air bubbles underneath.

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

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

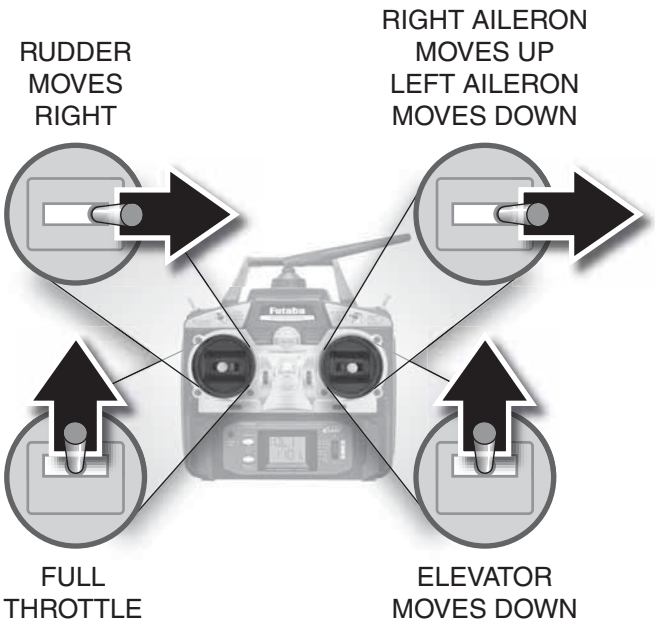
GET THE MODEL READY TO FLY

Check the Control Directions

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

❏ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to center the control surfaces. If you installed retracts, confirm their operation and that they lock both in the up and down positions.

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

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

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

These are the recommended control surface throws:

	LOW RATE	HIGH RATE
ELEVATOR	**Up & Down** 5/16" [8mm] 7°	**Up & Down** 1/2" [13mm] 11°
RUDDER	**Right & Left** 1-3/8" [35mm] 20°	**Right & Left** 1-7/8" [48mm] 28°
AILERONS	**Up & Down** 9/32" [7mm] 12°	**Up & Down** 7/16" [11mm] 19°

IMPORTANT: The Dirty Birdy has been **extensively** flown and tested to arrive at the throws at which it flies best. Flying your model at these throws will provide you with the greatest chance for successful first flights. If, after you have become accustomed to the way the Stinger flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model difficult to control, so remember, "more is not always better."

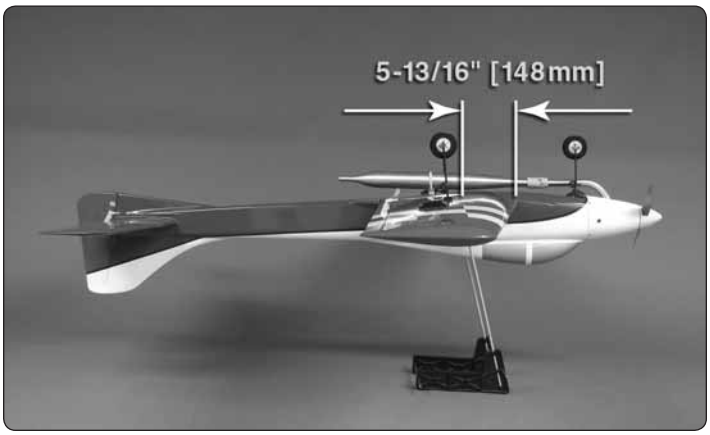
Balance the Model (C.G.)

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

At this stage the model should be in ready-to-fly condition with all of the systems in place including the engine or brushless motor, landing gear, and the radio system (and battery pack if applicable).

❏ 1. Use a felt-tip pen or 1/8" [3mm]-wide tape to accurately mark the C.G. on the top of the wing on both sides of the fuselage. The C.G. is located 5-13/16" [148mm] back from the leading edge of the wing.

This is where your model should balance for the first flights. Later, you may wish to experiment by shifting the C.G. up to 11/16" [17.5mm] forward or 11/16" [17.5mm] back to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but the model may then require more speed for takeoff and make it more difficult to slow for landing. Moving the C.G. aft makes the model more maneuverable, but could also cause it to become too difficult to control. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



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

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

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

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

Balance the Model Laterally

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

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

PREFLIGHT

Identify Your Model

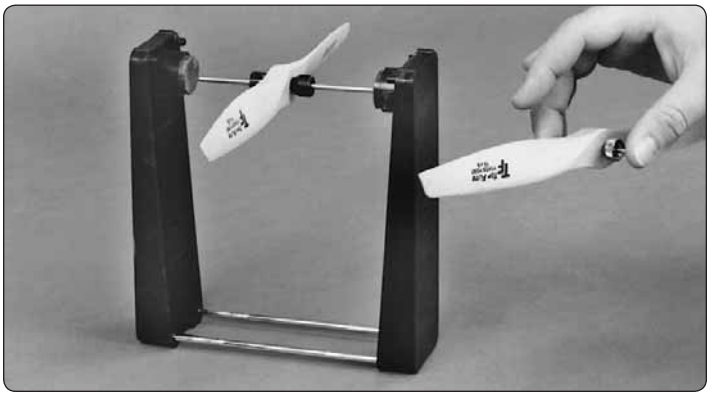
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification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

Charge the Batteries

Follow the battery charging instructions that came with your radio control system to charge the batteries. You should always charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

CAUTION: Unless the instructions that came with your radio system state differently, the **initial** charge on **new** transmitter and receiver batteries should be done for 15 hours **using the slow-charger that came with the radio system**. This will "condition" the batteries so that the next charge may be done using the fast-charger of your choice. If the initial charge is done with a fast-charger the batteries may not reach their full capacity and you may be flying with batteries that are only partially charged.

Balance Propellers



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

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

Ground Check

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

Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control (if using a 2.4GHz radio system, refer to the radio manual for the range checking procedure). Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test **with the engine running** at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash.

ENGINE SAFETY PRECAUTIONS

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

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

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

Use safety glasses when starting or running engines.

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

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

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

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

Make all engine adjustments from behind the rotating propeller.

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

To stop a glow engine, cut off the fuel supply by closing off the fuel line or following the engine manufacturer's recommendations. Do not use hands, fingers or any other body part to try to stop the engine. Do not throw anything into the propeller of a running engine.

AMA SAFETY CODE (excerpts)

Read and abide by the following excerpts from the Academy of Model Aeronautics Safety Code. For the complete Safety Code refer to *Model Aviation* magazine, the AMA web site or the Code that came with your AMA license.

General

1) I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously, successfully flight tested.

2) I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right-of-way and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.

3) Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

5) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. Note: This does not apply to models while being flown indoors.

7) I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

Radio Control

1) I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2) I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3) At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed at or in the front of the flight line. Intentional flying behind the flight line is prohibited.

4) I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

5) **I will not knowingly operate my model within three miles of any pre-existing flying site except in accordance with the frequency sharing agreement listed** [in the complete AMA Safety Code].

9) Under no circumstances may a pilot or other person touch a powered model in flight; **nor should any part of the model other than the landing gear, intentionally touch the ground, except while landing.**

CHECK LIST

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

❏ 1. Check the C.G. according to the measurements provided in the manual.

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

❏ 3. Extend your receiver antenna (if applicable).

❏ 4. Balance your model *laterally* as explained in the instructions.

❏ 5. Use threadlocking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.

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

❏ 7. Make sure all hinges are **securely** glued in place.

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

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

❏ 10. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.

❏ 11. Secure connections between servo wires and Y-connectors or servo extensions, and the connection between your battery pack and the on/off switch with vinyl tape, heat shrink tubing or special clips suitable for that purpose.

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

❏ 13. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.

❏ 14. Make sure the fuel lines are connected and are not kinked.

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

❏ 16. Tighten the propeller nut and spinner.

❏ 17. Place your name, address, AMA number and telephone number on or inside your model.

❏ 18. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.

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

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

FLYING

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

CAUTION (This applies to all R/C airplanes)

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

Takeoff

Before you get ready to takeoff, see how the model handles on the ground by doing a few practice runs at **low speeds** on the runway. If 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. If you have dual rates on your transmitter, set the switches to "high rate" for takeoff, especially when taking off in a crosswind. Although this model has good low-speed characteristics, you should always build up as much speed as your runway will permit before lifting off, as this will give you a safety margin in case of a "flame-out." When you first advance the throttle the plane will usually turn left slightly. Correct by applying sufficient right rudder to hold it straight down the runway. When the plane has sufficient flying speed, lift off by smoothly applying up elevator (don't "jerk" it off into a steep climb!), and climb out gradually.

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 Dirty Birdy for the first few flights, gradually getting acquainted with it as you gain confidence. Adjust the trims to maintain straight and level flight. After flying around for a while and while still at a safe altitude with plenty of fuel, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how the model climbs as well. Continue to fly around, executing various maneuvers and making mental notes (or having your assistant write them down) of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your fuel level, but use this first flight to become familiar with your model before landing.

Landing

To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (into the wind) keeping the nose down to maintain airspeed and control. Level the attitude when the model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and climb out to make another attempt. When you're ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, apply some down elevator to place the nose on the ground, regaining nose wheel control. Remember to mind your fuel level. Do not wait until your tank is empty to begin your landing approach. You will need some fuel left if you need to abandon your approach and circle back around.

One final note about flying your model. Have a goal or flight plan in mind for **every** flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily to improve your skills (*though it is never a bad idea!)*, but more importantly so you do not surprise yourself by impulsively attempting a maneuver and suddenly finding that you've run out of time, altitude or airspeed. Every maneuver should be deliberate, not impulsive. For example, if you're going to do a loop, check your altitude, mind the wind direction (anticipating rudder corrections that will be required to maintain heading), remember to throttle back at the top, and make certain you are on the desired rates (high/low rates). A flight plan greatly reduces the chances of crashing your model just because of poor planning and impulsive moves.

If you are new to pattern flying, there are many great websites on the internet that are dedicated to pattern flying. Other resources for pattern flying information is web forums and of course your local R/C flying club. Amateur videos of pattern flying demonstrations which can be found on the internet are also a great resource for learning. **Remember to think.**

Have a ball! But always stay in control and fly in a safe manner.

GOOD LUCK AND GREAT FLYING!