



# ***F1 ROCKET EVO***

## **INSTRUCTION MANUAL**

### **SPECIFICATIONS**

<b>Wingspan:</b> 52 in [1320mm]	<b>Radio:</b> Four channel (minimum) with 5 servos	<b>Engine:</b> .46 -.55 cu in [7 – 9cc] two-stroke, .70 cu in [11.5cc] four-stroke
<b>Length:</b> 44 in [1120mm]		<b>Electric Power:</b> RimFire 55
<b>Weight:</b> 6–7 lb [2720–3170 g]		
<b>Wing Area:</b> 448 in <sup>2</sup> [28.9 dm <sup>2</sup> ]		
<b>Wing Loading:</b> 31 oz/ft <sup>2</sup> [95 g/dm <sup>2</sup> ]		

### **WARRANTY**

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

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

**If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return**

**this kit immediately in new and unused condition to the place of purchase.**

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

#### **Hobby Services**

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

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

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



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

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## INTRODUCTION

The F-1 Rocket is another in a line of homebuilt aircraft for general aviation enthusiasts. We think you will enjoy this model rendition of the Rocket. Though it is a "scale" model you will find its performance to be on par with typical aerobatic airplanes. You will enjoy putting the Rocket through loops, rolls, etc. For the latest technical updates or manual corrections to the F-1 Rocket visit the Great Planes web site at [www.greatplanes.com](http://www.greatplanes.com). Open the "Airplanes" link, then select the F-1 Rocket 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

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

### Academy of Model Aeronautics

5151 East Memorial Drive  
Muncie, IN 47302-9252

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

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



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

## SAFETY PRECAUTIONS

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

1. Your F-1 Rocket 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 F-1 Rocket, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.
2. You must assemble the model according to the instructions. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
3. You must take time to **build straight, true and strong**.
4. You must use an R/C radio system that is in good condition, a correctly sized engine, and other components as specified in this instruction manual. All components must be correctly installed so that the model operates correctly on the ground

and in the air. You must check the operation of the model and all components before **every** flight.

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

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

7. **WARNING:** The cowl and wheel pants 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 (wheel pant, cowl) 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 F-1 Rocket that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

### Motor / Battery Recommendations

The Evo Rocket comes with a motor box for the ElectriFly RimFire .55 and the O.S. Brushless Motor.

- GPMG4715 RimFire .55 42-60-480 Brushless Motor
- OSMG9550 O.S. Brushless Motor
- GPMQ4610 O.S. 6mm Propeller Adapter

The Evo Rocket was flown with two ElectriFly 3S, 11.1, 3200 mAh 25C Lithium-Polymer Batteries.

Using these two batteries in series will require the use of the (GPMM 3143) ElectriFly Series 2 Deans® male, Ultra /1 Deans Female Ultra Adapter

**IMPORTANT:** Before experimenting with different battery combinations and connecting multiple battery packs with adapter plugs, refer to the **Battery Precautions** on page 22.

## Electronic Speed Control

A brushless ESC (electronic speed control) is required for the recommended motor set-up. We recommend using the ElectriFly Silver Series SS-60 Brushless ESC 60A Hi Voltage or Flight Power 60A LiPo Brushless ESC

- GPMM1850 ElectriFly SS-60 Brushless ESC 60A Hi Voltage
- FPWM0234 Flight Power 60A LiPo Brushless ESC

Optional Voltage Regulator (CSEM0005) eliminates the need for a receiver battery.

## Recommended Charger

A LiPo compatible charger is required to charge the LiPo battery. The Great Planes ElectriFly Triton2 EQ AC/DC Charger is designed for LiPo packs, but is also capable of charging NiCd, NiMH, Pb acid and LiFe batteries.

- GPMM3156 Great Planes ElectriFly Triton2 EQ AC/DC Charger.

## Radio Equipment

The Evo F-1 Rocket requires a minimum of four channels. The airplane requires the use of five servos for the glow engine installation, or four servos for the electric motor installation. A servo with a minimum 54oz-in of torque is required on all of the control surfaces. A lower torque servo is acceptable on the throttle servo. We used the Futaba 9001 (FUTM0075) throughout our testing. Additionally, two 6" [150mm] servo extensions (HCAM2701 for Futaba) are required for the aileron servos and one 6" Y-harness (FUTM4135 for Futaba).

## Engine Recommendations

The recommended engine size range for the F-1 Rocket is .46 -.55 cu in [7 – 9cc] two-stroke, or .70 cu in [11.5cc] four-stroke. If an engine in the upper end of the size range is used, remember that this is a scale model that is intended to fly at scale-like speeds, so throttle management should be practiced. A Pitts style muffler specific to your engine choice is recommended.

## ADDITIONAL ITEMS REQUIRED

### Adhesives and Building Supplies

This is the list of Adhesives and Building Supplies that are required to finish the F-1 Rocket

- 1/2 oz. [15g] Thin Pro CA (GPMR6001)
- 1 oz. [30g] Medium Pro CA+ (GPMR6008)
- Pro 30-minute epoxy (GPMR6047)
- Pro 6-minute epoxy (GPMR6045)
- Drill bits: 1/16" [1.6mm], 5/64" [2mm], 7/64" [2.8mm]
- 6-32 tap and drill set (GPMR8102)
- Thread locker thread locking cement (GPMR6060)

## Optional Supplies and Tools

Here is a list of optional tools mentioned in the manual that will help you build the F-1 Rocket.

- R/C foam rubber 1/4" [6mm] - (HCAQ1000)
- Mixing sticks 50, (GPMR8055)
- Mixing cups (GPMR8056)
- 21st Century sealing iron (COVR2700)
- 21st Century iron cover (COVR2702)
- 2 oz. [57g] spray CA activator (GPMR6035)
- CA applicator tips (HCAR3780)
- Hobbico Soldering Iron 60 Watt (HCAR0776)
- #1 Hobby knife (HCAR0105)
- #11 blades (5-pack, HCAR0211)
- Denatured alcohol (for epoxy clean up)

## IMPORTANT BUILDING NOTES

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

**Sheet Metal Screws** are designated by a number and a length. For example #6 × 3/4" [19mm].

*This is a number six screw  
that is 3/4" [19mm] long.*



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

*This is a number four screw  
that is 3/4" [19mm] long with  
forty threads per inch.*



**Socket Head Cap Screws (SHCS)** are designated by a number, **threads per inch**, and a length. For example 4-40 × 3/4" [19mm].

*This is a 4-40 SHCS that  
is 3/4" [19mm] long with  
forty threads per inch.*



- 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 F-1 Rocket is factory-covered with Top Flite MonoKote film. Should repairs ever be required, MonoKote can be patched with additional MonoKote purchased separately. MonoKote is packaged in six-foot rolls, but some hobby shops also sell it by the foot. If only a small piece of MonoKote is needed for a minor patch, perhaps a fellow modeler would give you some. MonoKote is applied with a model airplane covering iron, but in an emergency a regular iron could be used. A roll of MonoKote includes full instructions for application. Following are the colors used on this model and order numbers for six foot rolls.

Jet White TOPQ0204    Metallic Plum TOPQ0403  
Cub Yellow TOPQ0220    Metallic Blue TOPQ0402

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

## KIT INSPECTION

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

### Great Planes Product Support

3002 N Apollo Drive, Suite 1    Ph: (217) 398-8970, ext. 5  
Champaign, IL 61822    Fax: (217) 398-7721

E-mail: [airsupport@greatplanes.com](mailto:airsupport@greatplanes.com)

## ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes F-1 Rocket 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](http://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.

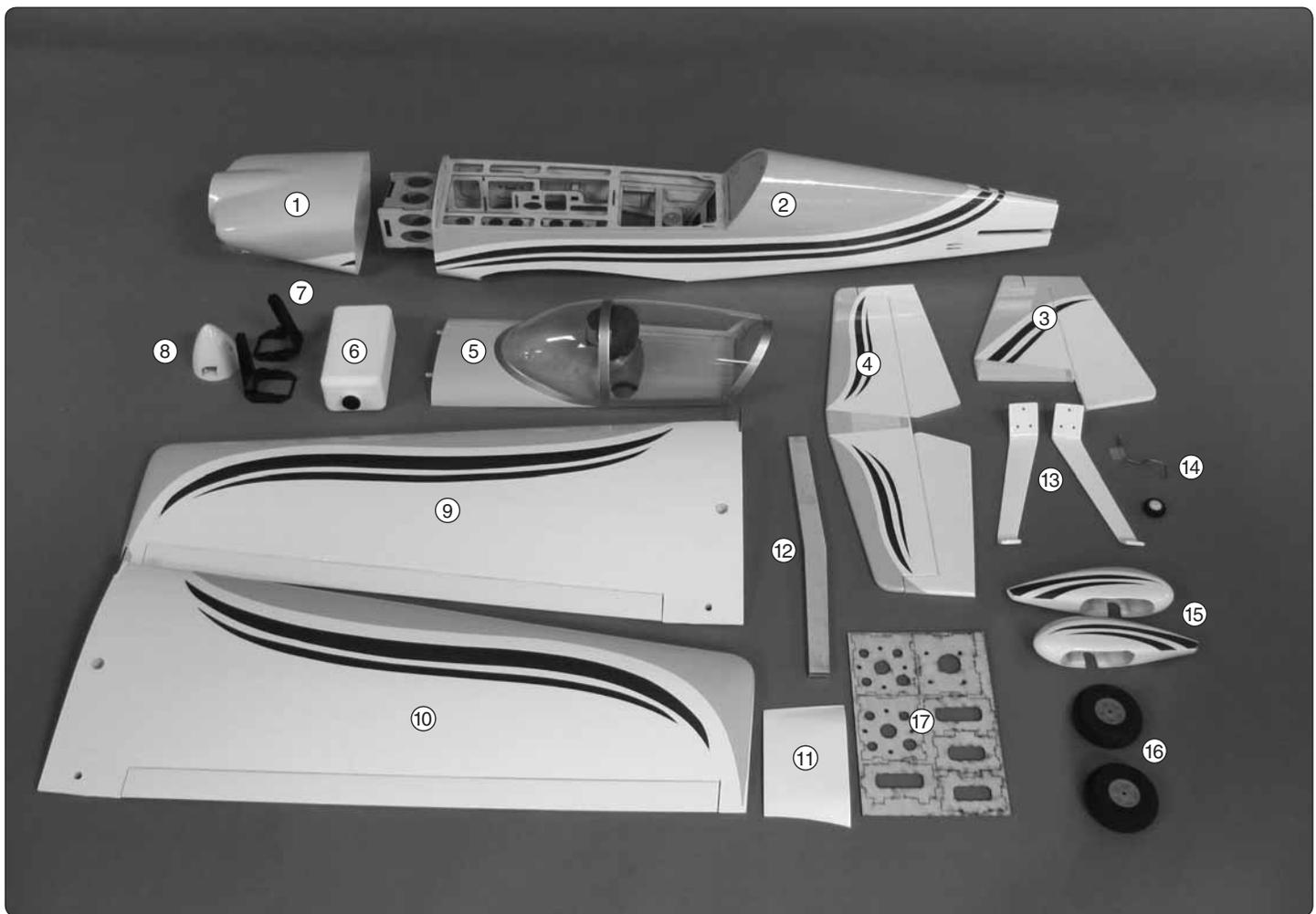
Mail parts orders and payments by personal check to: **Hobby Services**  
3002 N Apollo Drive, Suite 1  
Champaign IL 61822

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](mailto:productsupport@greatplanes.com), or by telephone at (217) 398-8970.

REPLACEMENT PARTS LIST	
Order No.	Description
GPMA4320	Fuselage
GPMA4321	Wing
GPMA4322	Tail Surfaces
GPMA4323	Cowl
GPMA4324	Hatch
GPMA4325	Landing Gear
GPMA4326	Wheel Pants
GPMA4327	Spinner
GPMA4328	EP Motor Mount
GPMA4329	Decals

## KIT CONTENTS



### Kit Contents

- |                              |                  |                         |
|------------------------------|------------------|-------------------------|
| 1. Cowl                      | 7. Motor Mount   | 13. Landing Gear        |
| 2. Fuselage                  | 8. Spinner       | 14. Tail Wheel Assembly |
| 3. Fin and Rudder            | 9. Left Wing     | 15. Wheel Pants         |
| 4. Stabilizers and Elevators | 10. Right Wing   | 16. Wheels              |
| 5. Canopy Hatch              | 11. Wing Fairing | 17. Electric Motor Box  |
| 6. Fuel Tank                 | 12. Wing Spar    |                         |

## PREPARATIONS

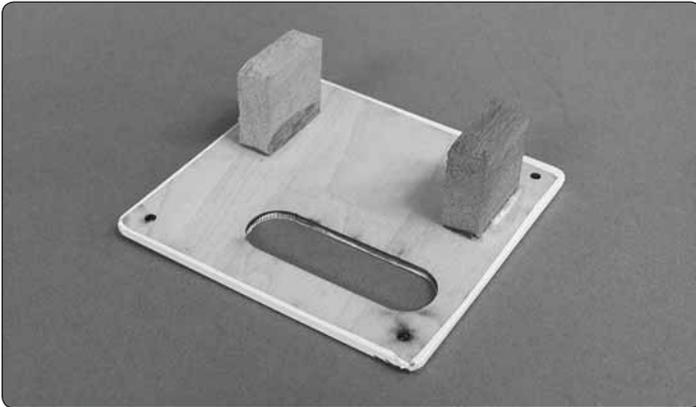
1. If you have not done so already, remove the major parts of the kit from the box and inspect for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the "Kit Inspection" on the previous page.
2. Use a covering iron with a covering sock on high heat to tighten the covering if necessary. Apply pressure over sheeted areas to thoroughly bond the covering to the wood.

## BUILD THE WING

Begin the wing assembly with the right wing panel so your assembly matches the photographs in the manual.

### Install the Aileron Servos & Pushrods

1. Cut three arms from a four-armed servo arm for each aileron servo. Enlarge the outer hole of the remaining servo horn arms with a 5/64" [2mm] drill bit. Center the servos with your radio system and install the servo arms to the servo perpendicular to the servo case as shown. Be sure to reinstall the servo arm screws into the servos.

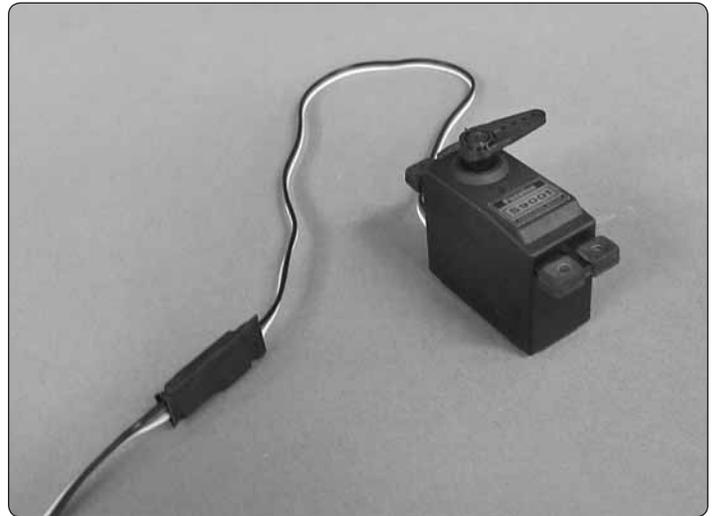


2. Place your servo onto the servo tray, using it as a guide for the installation of the aileron servo mounting blocks. Use epoxy to glue the 3/4" x 3/4" x 5/16" [19x19x8mm] hardwood servo mounting blocks to the inside of the hatch cover. Set the cover aside to allow the glue to harden.

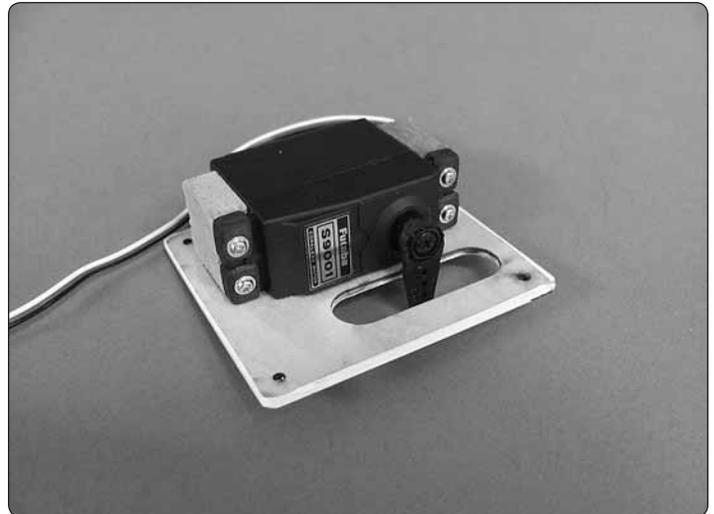


3. With the epoxy completely cured from step 2, drill 1/16" [1.6mm] holes in the hatch covers through the mounting blocks approximately 3/8" [9.5mm] deep. Thread a 5/64" x

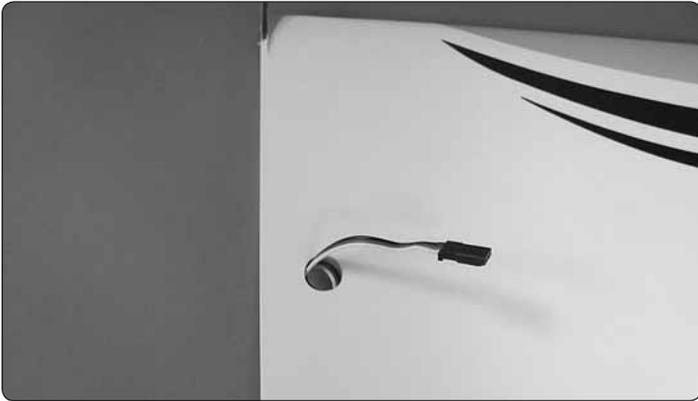
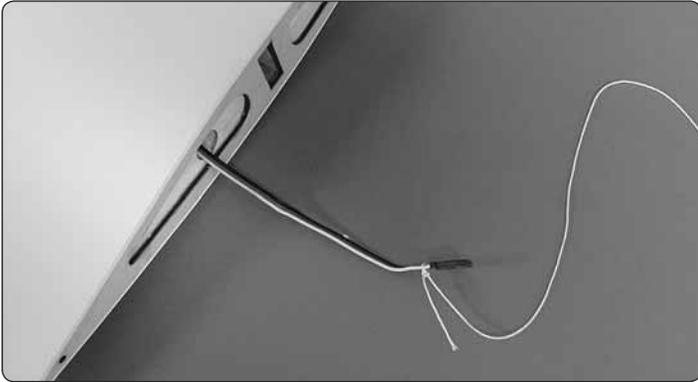
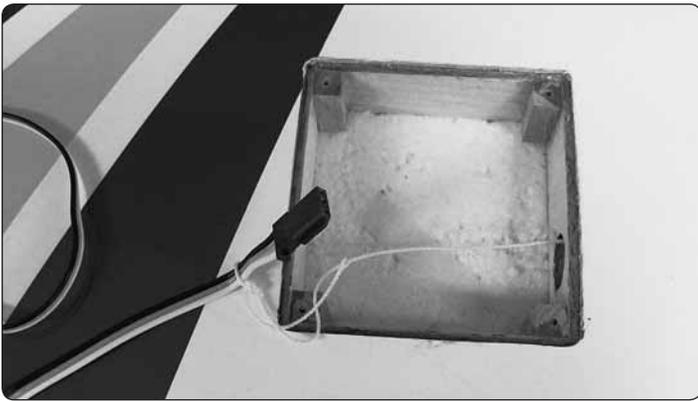
3/8" [2 x 10mm] washer head wood screw into each hole and back it out. Apply a drop of thin CA glue into each hole to harden the wood. When the CA glue has dried, thread a 5/64" x 3/8" [2 x 10mm] washer head screw into each of the holes.



4. Attach a 6" [152mm] servo extension to each aileron servo and secure the connector using tape or heat shrink tubing (not included).



5. Position the servos against the underside of the aileron servo hatch covers between the mounting blocks. Drill 1/16" [1.6mm] holes through the mounting tabs on the servo cases into the blocks. 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. When the CA has dried, install the servos onto the hatch covers using the hardware supplied with the servos.



□ □ 6. Use the strings taped inside the aileron servo hatches to pull the servo leads through the wing ribs. After pulling the servo leads through the wing, insert the connector through the hole in the top of the wing.

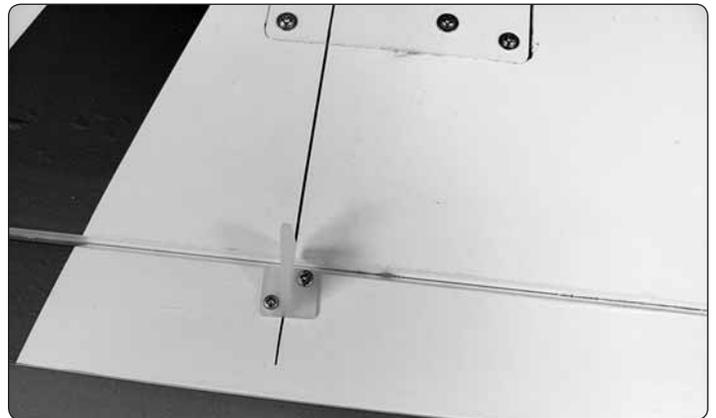


□ □ 7. Position the aileron servo hatch covers in place. Drill 1/16" [1.6mm] holes through each of the four holes in the servo covers and into the hardwood blocks. Thread a 5/64"

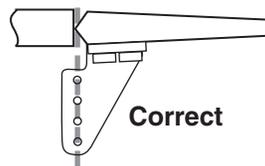
x 3/8" [2 x 10mm] washer head wood screw into each hole you drilled and back it out. Apply a drop of thin CA glue into each hole to harden the wood. When the CA glue has dried, thread a 5/64" x 3/8" [2 x 10mm] washer head screw into each of the four holes. When positioning the hatch be sure the servo arm is towards the wing tip.



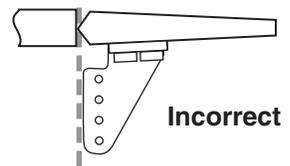
□ □ 8. Mark the location for the control horn onto the aileron with a fine tip, felt tip marker. The mark can be removed later with a paper towel and alcohol.



Hinge Line



Hinge Line



□ □ 9. Position the control horn centered on the mark you made, positioning it as shown. Drill a 1/16" [1.6mm] hole

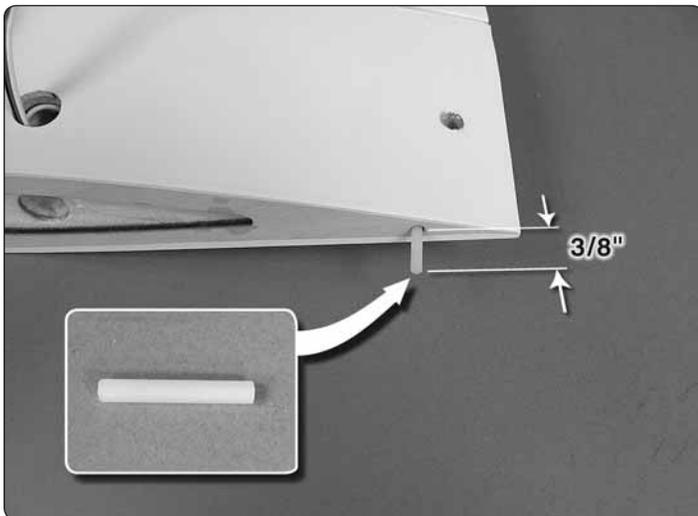
through the mounting holes in the control horn, drilling through the aileron. Insert a 5/64" x 5/8" [2x16mm] machine screw through the control horn and the aileron. Secure the horn by threading the screws into the nylon back plate, tightening it to the aileron.



□ □ 10. Thread a nylon clevis 20 complete turns onto each 6" [152mm] pushrod. Slide a silicone clevis retainer onto the clevis and connect the clevises to the outer holes of the control horn. Center the servo and aileron and then mark the pushrod where it aligns with the hole in the servo arm. Make a 90 degree bend on the mark. Cut the excess wire, leaving 3/8" [9.5mm] of wire. Insert the wire through the outer hole in the servo arm securing it with a nylon Faslink.

□ 11. Repeat steps 1-10 for the left wing.

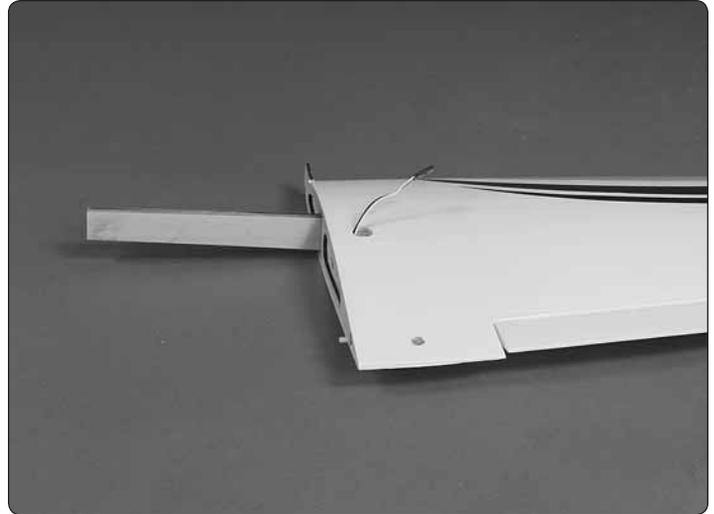
### Finish the Wing Panels



□ 1. Use epoxy to glue the 1/8" x 3/4" [3 x 19mm] **anti-rotation pin** into the hole at the trailing edge of the root rib of the right wing panel. Half of the pin should be inserted into the wing. Use a paper towel dampened with denatured alcohol to wipe away any excess epoxy.



□ 2. Examine the plywood and aluminum wing spar. The photo indicates the top of the spar. Pay close attention while gluing it in place in the next step to be sure you glue it properly into the wing panels.



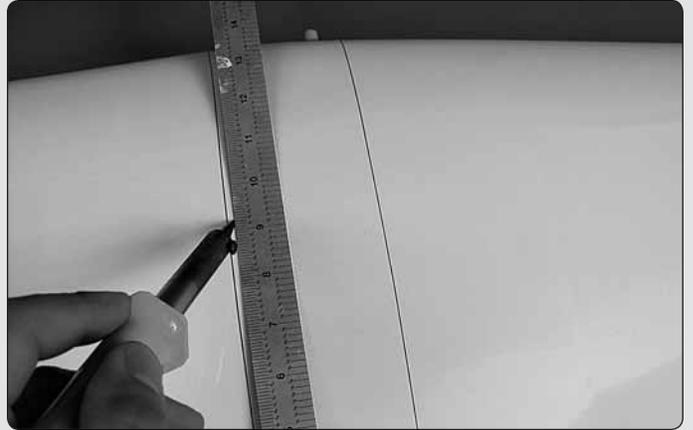
□ 3. Apply 30 minute epoxy to the wing spar, the spar opening in both wings and the root rib of both wings. Insert the spar into the right wing and then slide the left wing onto the spar. Push the wings together slowly, removing any excess epoxy as you go. Once the wings are together clean any excess epoxy with a paper towel and alcohol. Clamp the front of the wing together, tape the wing and insert two wing bolts in the holes in the trailing edge of the wing. Wrap a rubber band around the bolts to hold everything together while the glue hardens.

□ 4. After the glue has hardened secure the wing to the fuselage using two 1/4-20 x 2" [51mm] nylon wing bolts.

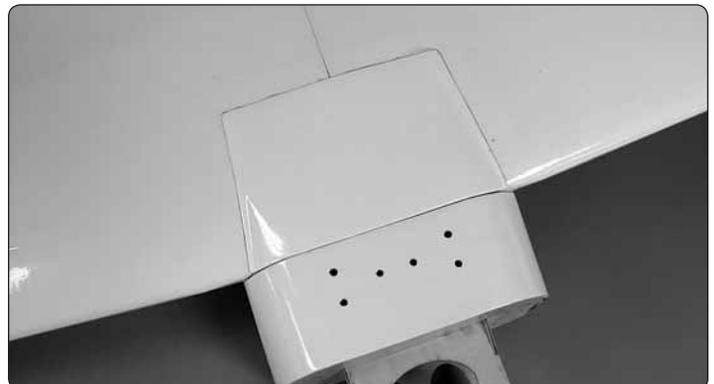
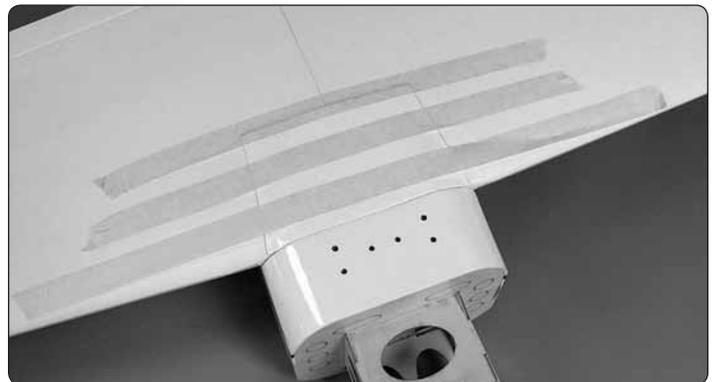


### HOW TO CUT COVERING FROM Balsa

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

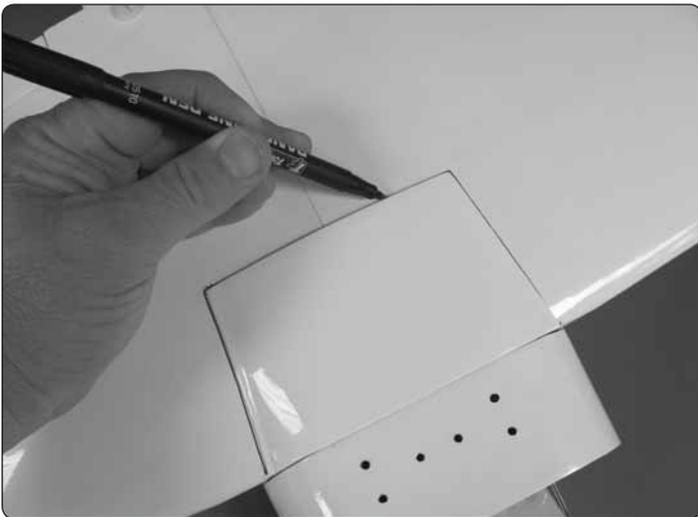
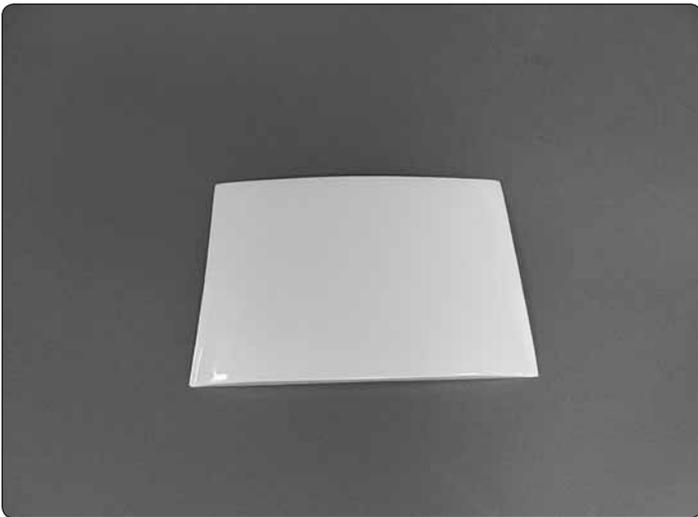


Use a straightedge to guide the soldering iron at a rate that will just melt the covering and not burn into the wood. The hotter the soldering iron, the faster it must travel to melt a fine cut. Peel off the covering.

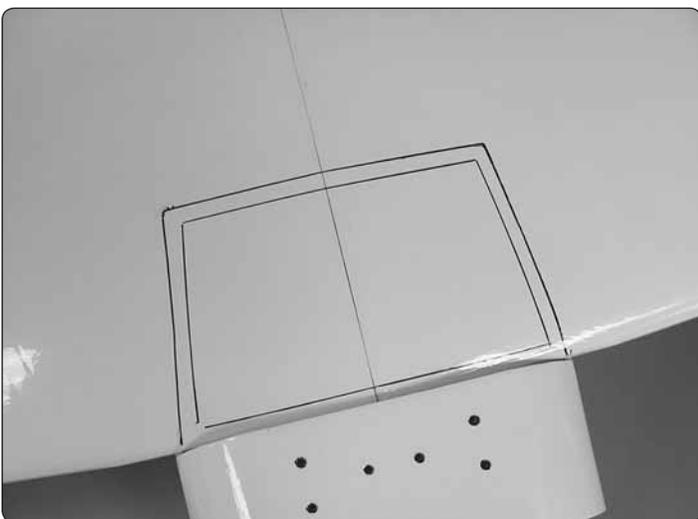


Lightly sand the inside of the fairing where it will contact the wing surface. Wipe it clean with a paper towel and alcohol. Glue the fairing to the wing, tape it in place and allow the glue to harden.

Leave the wing in place on the fuselage for the next few steps.



5. Locate the plastic wing fairing, place it on the bottom of the wing and trace the position onto the wing with a fine tip felt tip marker.

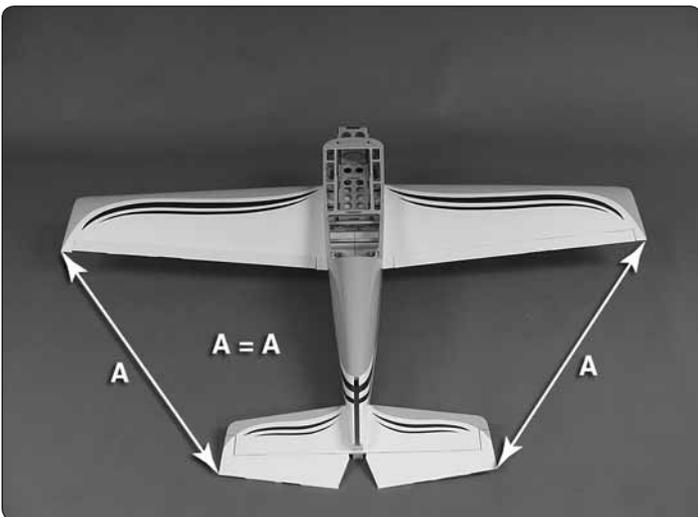
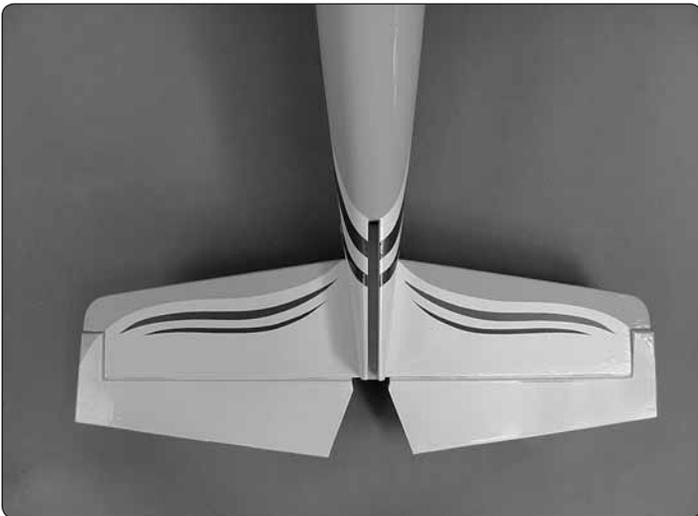
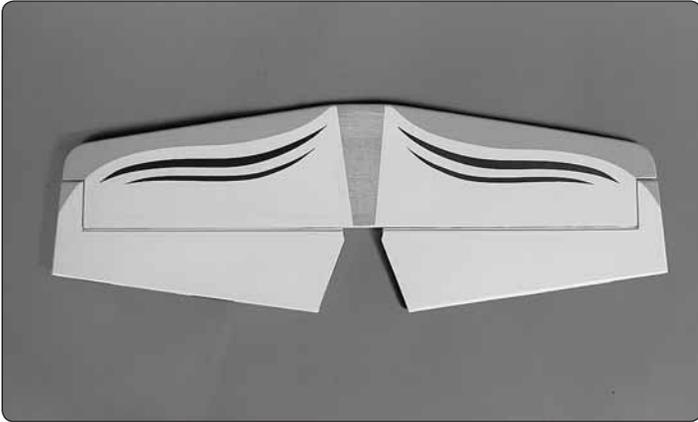


6. Use a sharp hobby knife (or use the technique, "HOW TO CUT COVERING FROM Balsa", shown to the right) to cut the covering away from the wing in the area you outlined. Be careful not to cut into the wing skin.

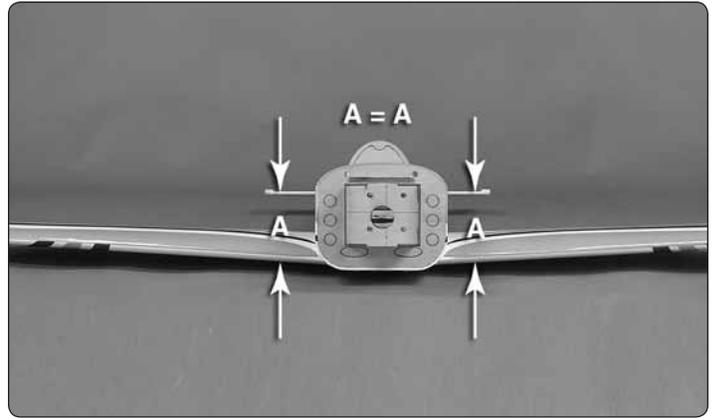
## BUILD THE FUSELAGE

It will be helpful in the assembly process to remove the canopy. To remove the canopy, slide it forward and lift the back of the canopy, removing it from the fuselage.

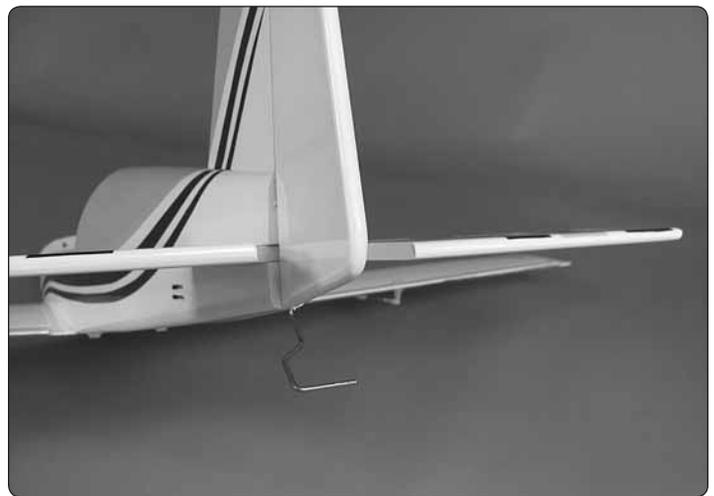
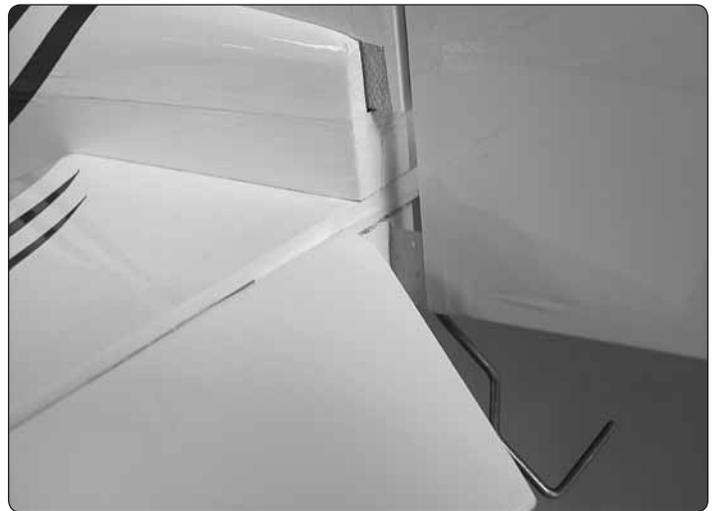
### Assemble the Tail Section



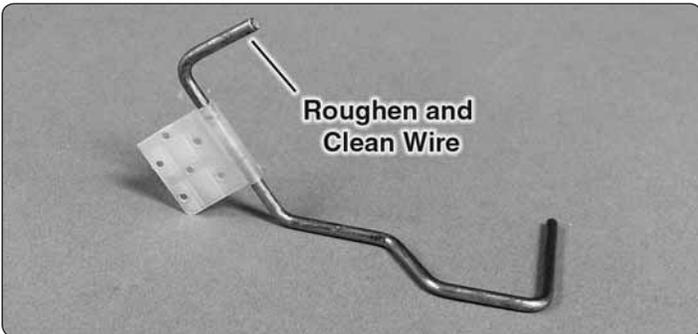
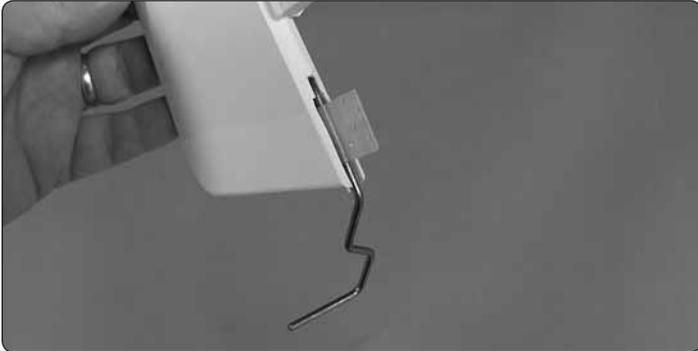
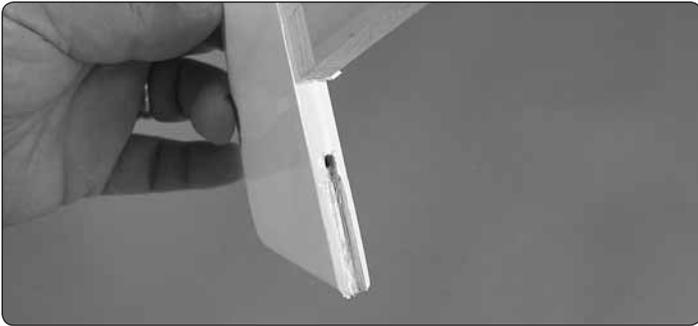
❑ 1. Slide the horizontal stabilizer into the stab slot at the aft end of the fuselage. Center the stab left and right in the fuselage. Measure the distance from the stab tips to the wing tips and make the measurements equal.



❑ 2. Use 30-minute epoxy to glue the stab into the fuselage. View the model and confirm that the stab is parallel with the wing panels. If not, use a weight on one side of the stab or tape to bring the stab parallel. Lightly sanding the stab slot may also be necessary. Use denatured alcohol to clean up any excess epoxy. Allow the epoxy to cure undisturbed. After the glue has hardened, remove the wing from the fuselage.



❑ 3. Apply a thin coat of epoxy to the exposed wood on the vertical fin and inside the opening in the fuselage for the fin. Apply a thin film of epoxy to the plastic tab on the tail wheel wire. Slide the fin in place, making sure you insert the plastic tab in the slot in the back of the fuselage.

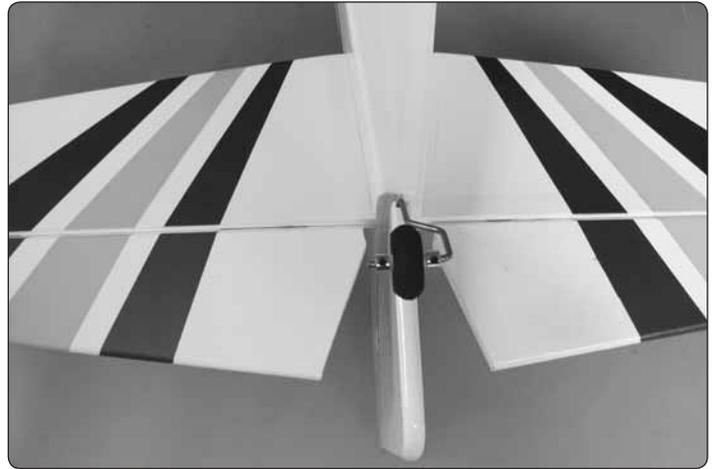


❑ 4. On the leading edge of the rudder is a slot and hole for the tail wheel wire. Test fit the wire into the hole to be sure there is a good fit. Remove the wire from the rudder. Roughen the portion of the tail wheel assembly that fits into the rudder with 220-grit sand paper and clean it off with alcohol. Glue the tail wheel wire into the hole in the LE of the rudder with 5 minute epoxy. Be sure not to get glue onto the nylon tab where it rotates on the wire (oil applied on the tail wheel wire around the tab will help prevent glue from sticking to it). Lightly coat both sides of the nylon tab with epoxy and fit the fin and rudder to the fuselage. Allow the glue to harden before moving on to the next step.



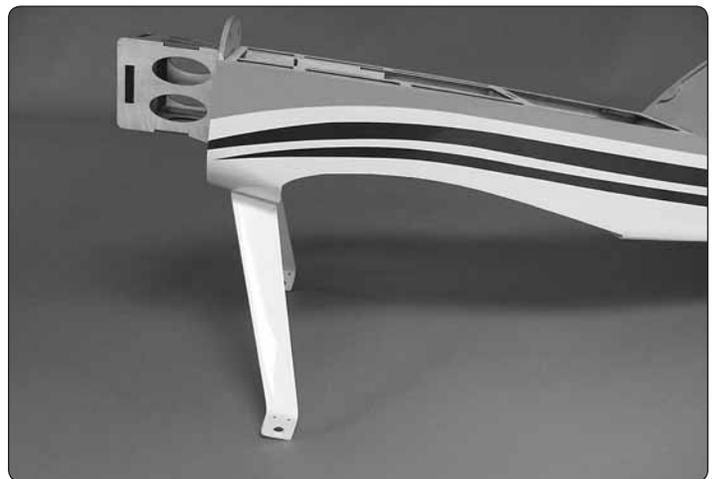
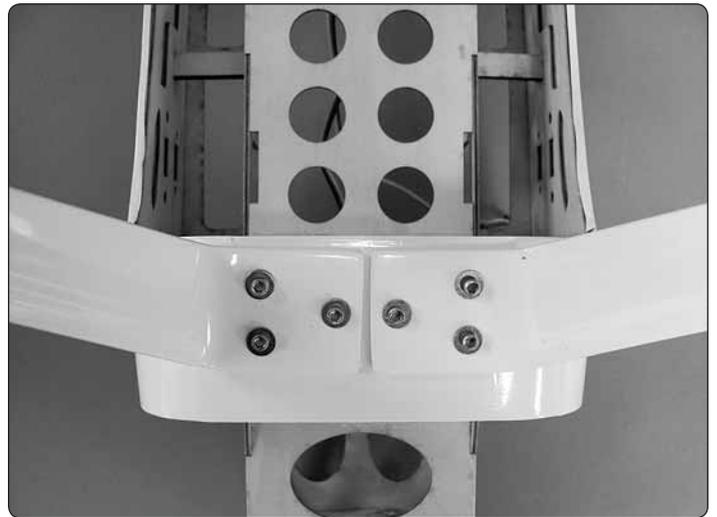
❑ 5. Temporarily install the tail wheel, two 3/32" [2.7mm] wheel collars and a 4-40 set screw onto the tail wheel wire.

Mark the location where the set screws make contact with the wire. File a flat spot on the wire on the marks.

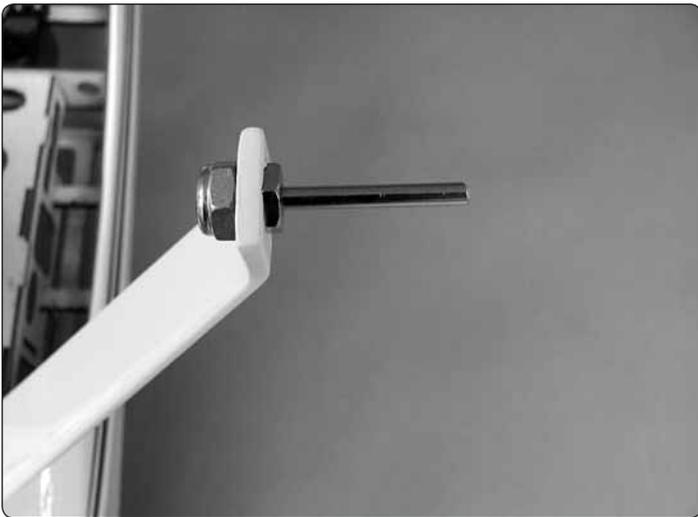


Once completed, secure the tail wheel to the tail wheel assembly. Be sure that the tail wheel rotates freely on the axle. Oil the axle if necessary.

### ***Install Landing Gear & Wheel Pants***



❑ 1. Install the landing gear to the fuselage with six 4-40 x1/2" [13mm] and six #4 [3mm] flat washers. When installing the landing gear, the landing gear legs should sweep back. Be sure to apply threadlocker to the bolts.



❑ 2. Install the 5/32 x 1-1/4" [32mm] axle into the landing gear and secure it with the 5/16-24 [7.9mm] nut. Do this for both landing gear legs. Position the flat spot as shown.

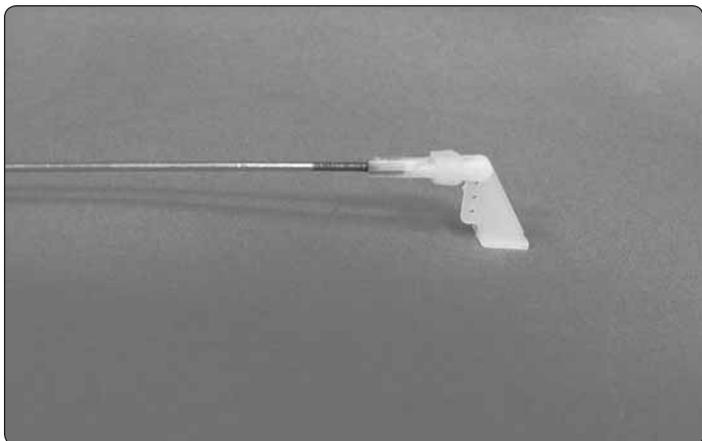


❑ 3. Install a 6-32 x 1/8" [3.2mm] set screw into each of the four 5/32" [4.3mm] wheel collars. Be sure to apply a couple drops of thread locker to the set screws. Slide a wheel collar onto the axle followed by the wheel and another wheel collar. Tighten the set screw against the axle. Be sure the set screw is tightened against the flat spot on the end of the axle.

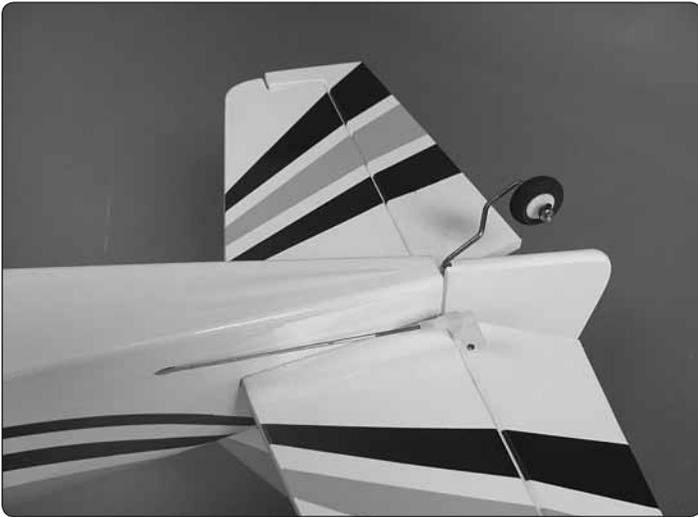


❑ 4. Slide the wheel pant over the wheel and secure the wheel pant to the landing gear with two 2-56 x 3/8" [9.5mm] screws and two #2 [2mm] flat washers. Be sure to apply thread locker to each screw.

***Install the Servos and Pushrods***



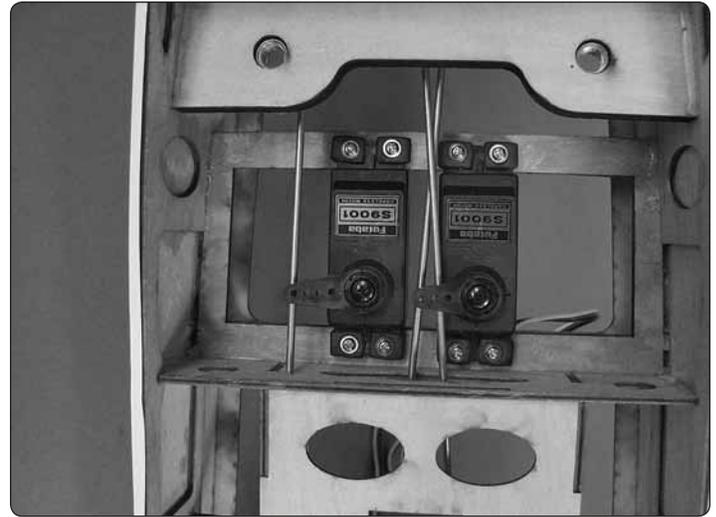
❑ 1. Thread a nylon clevis and silicone clevis retainer onto a 2-56 x 24" [610mm] pushrod 20 complete turns. Install a silicone clevis keeper onto the clevis. Install the clevis into the outer hole of the control horn. Slide the wire through the elevator pushrod exit slot in the right side of the fuselage.



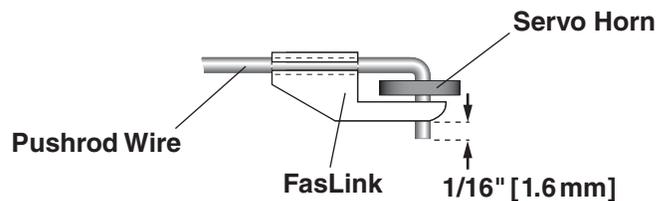
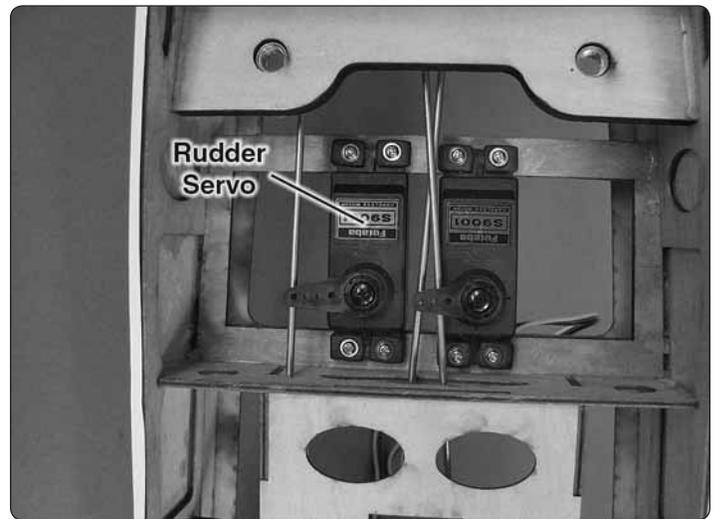
□ 2. Position the control horn on the elevator at the hinge line using the same technique used on the ailerons. Drill a 1/16" [1.6mm] hole through the mounting holes in the control horn, drilling through the elevator. Insert a 5/64" x 9/16" [2x14mm] machine screw through the control horn and the aileron. Secure the horn by threading the screws into the nylon back plate, tightening it to the aileron.



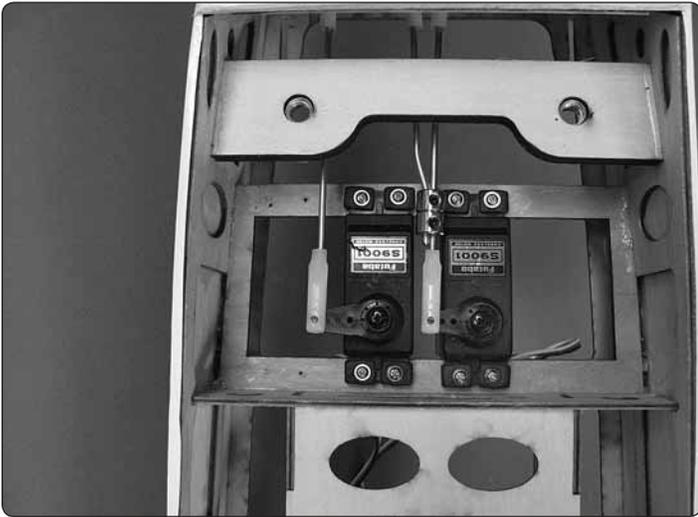
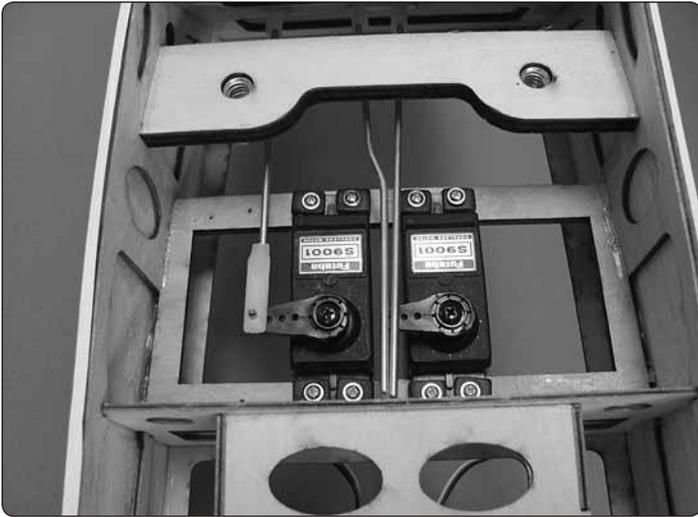
□ 3. Repeat step 2 for the remaining elevator half and the rudder.



□ 4. Install the elevator and rudder servos into the servo tray in the direction shown using the hardware supplied with the servos. Be sure to harden the screw holes with thin CA as was done with the aileron servos. Cut three arms from two four-armed servo arms. Center the servos with your radio system and install them onto the servos, perpendicular to the servo case with the servo screws. Enlarge the outer holes of each servo arm with a 5/64" [2mm] drill bit.



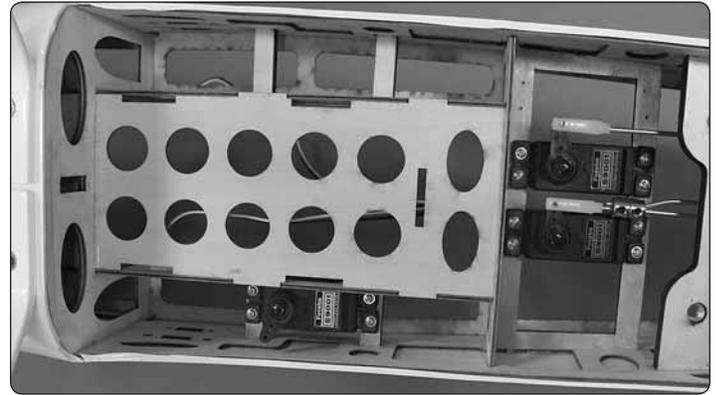
□ 5. Center the rudder, then make a mark on the pushrod wire where it aligns with the outer hole in the servo arm. Make a 90 degree bend at the mark and cut off the excess pushrod 1/4" [6mm] beyond the bend. Secure the pushrod to the servo arm with a nylon FasLink. Make any adjustments necessary to the nylon clevis so that the rudder is properly centered, then slide the silicone clevis retainer to the end of the clevis.



❑ 6. Bend one of the elevator pushrod wires as shown. Align both the left and right elevator halves. Apply a couple of drops of thread locker onto two 4-40 x 1/8" [3.2mm] set screws and then install them into two 5/32" wheel collars. Slide the wheel collars onto both of the wires. On the wire you made the bends, make a mark where the outer wheel collar rests. Cut off the excess wire. Tighten the set screws against the pushrod wires.

❑ 7. As you did with the rudder, make a mark on the remaining elevator pushrod wire where it aligns with the outer hole in the servo arm. Make a 90 degree bend at the mark and cut off the excess pushrod 1/4" [6mm] beyond the bend. Secure the pushrod to the servo arm with a nylon FasLink. Make any adjustments necessary to the nylon clevis so that the elevator is properly centered.

***If you will be installing an electric motor skip the next step and move ahead to "Installing the Electric Motor on page 17.***

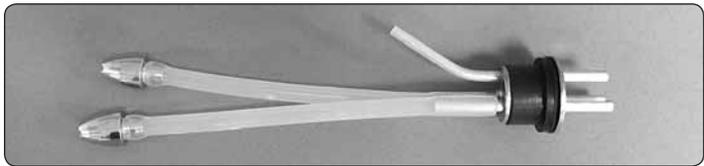


❑ 8. Though the engine has not been installed yet, determine which side of the fuselage to install the throttle servo based on the location of the throttle arm on the engine. Install the servo as shown using the hardware that came with the servo. Drill a 5/64" hole in the outer servo arm hole.

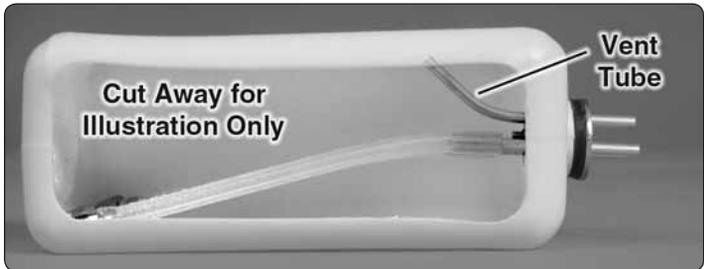
## INSTALL THE POWER SYSTEM

The F-1 Rocket ARF is designed to be flown with a .46-.55 two-stroke glow engine, .70 four-stroke glow engine, or an out-runner brushless motor. If you plan to install a brushless motor, skip ahead to page 17, "Install the Electric Motor".

### Glow Engine Installation



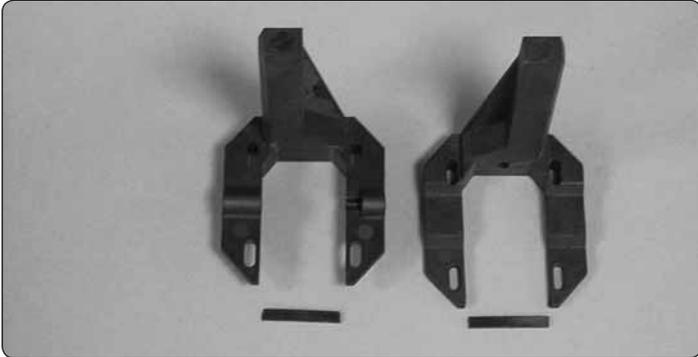
❑ 1. The fuel tank will be assembled as a three line system having a vent line, carb line, and fill line. Puncture the top of the stopper above the sealed off fuel tube hole. With the tubes installed in the stopper, fit the stopper plates loosely in place with the 3x25mm phillips screw to hold the assembly together. The fill and carb tubes should extend out 1/2" [13mm] beyond the stopper and the vent line should be bent upwards and left uncut.



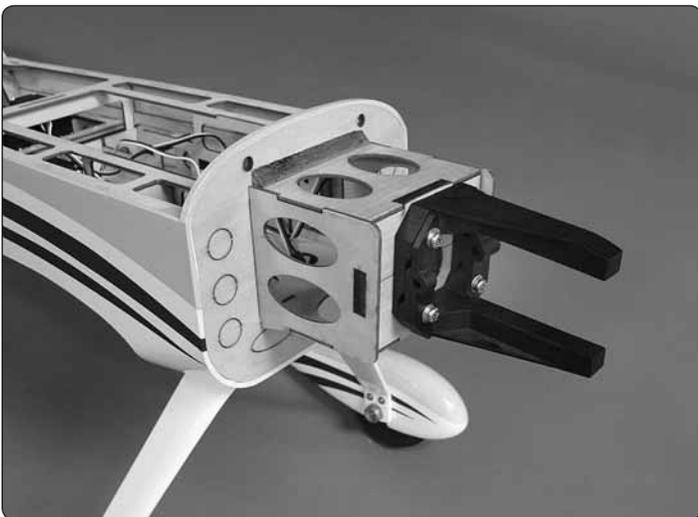
❑ 2. Fit the stopper assembly into the tank with the vent line pointing toward the top of the tank, but not touching. The fuel

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 3x25mm 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. We also suggest marking the tubes in the stopper so you will remember which is the vent line, fill line and overflow.

❑ 3. Attach a 6"-7" [152mm-178mm] piece of fuel tubing onto each tube coming from the tank. Insert the tank into the fuselage with the correct side facing up. The fuel tubing should be routed through the hole in the center of the firewall.

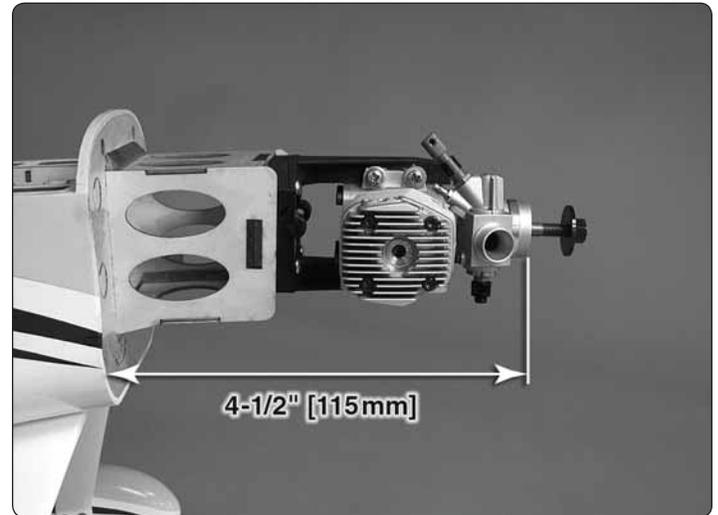


❑ 4. Locate the two halves of the engine mount. Cut the parts from the mount as shown. With the parts removed, slide the two halves of the mount together.



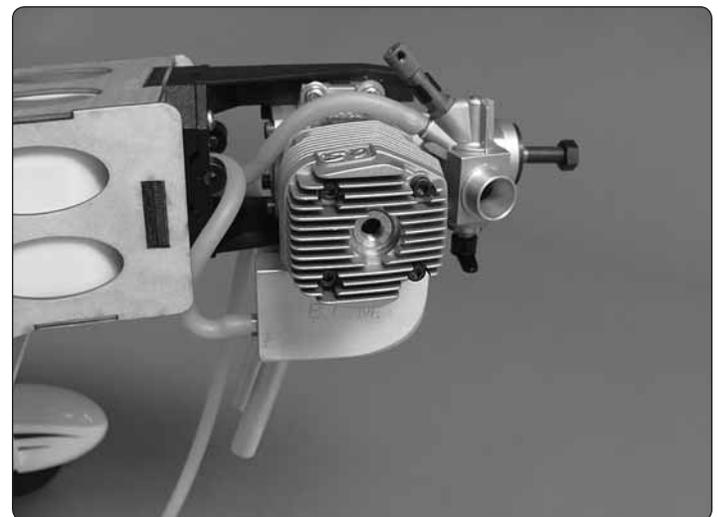
❑ 5. Using four 6-32 x 1" [25mm] SHCS, four #6 flat washers, four #6 lock washers, and thread locking compound, attach the engine mount side-mounted to the firewall so that the engine

head will be on the right side. Test fit your engine between the mount halves. Slide the mount halves against the sides of the engine and finish tightening the mount screws.

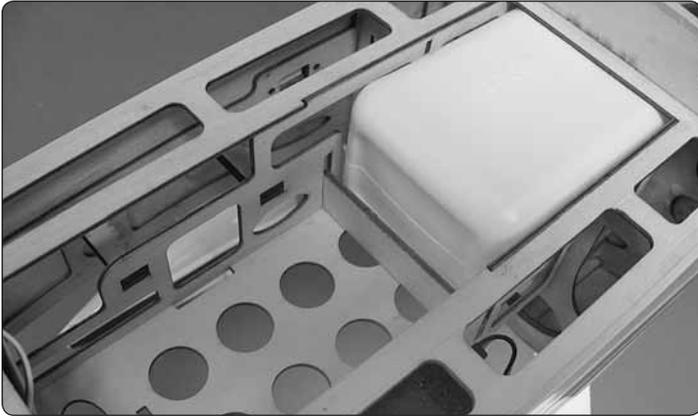
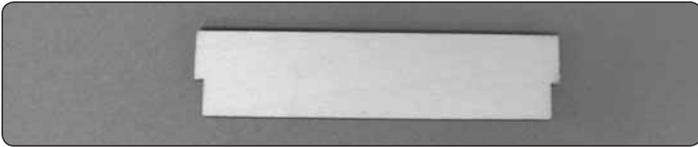


❑ 6. Position the front of the engine drive washer 4-1/2" [115mm] from the front of the engine mounting box. Mark the location of the engine mount holes onto the mount rails using a Dead Center Hole Locator (GPMR8130). Remove the engine from the mount. Drill a #36 or 7/64" [3.8mm] hole on each of the marks you made. Use a 6-32 tap to create threads in the four mounting holes. Attach the engine to the mount using four 6-32 x 1" [25mm] screws, four #6 flat washers, and four #6 lock washers.

❑ 7. If you installed a two-stroke engine, attach a Pitts-style in-cowl muffler. The stock muffler could also be used, but excessive cutting of the cowl would be necessary. We suggest using a Pitts-style muffler.



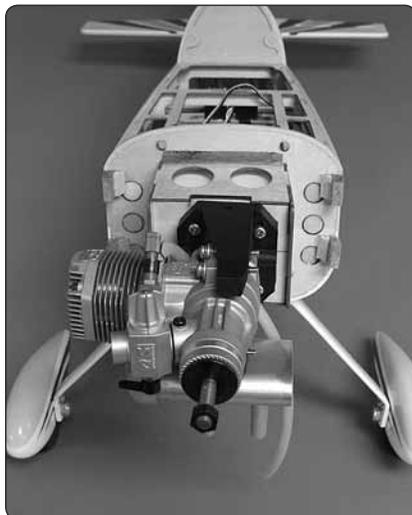
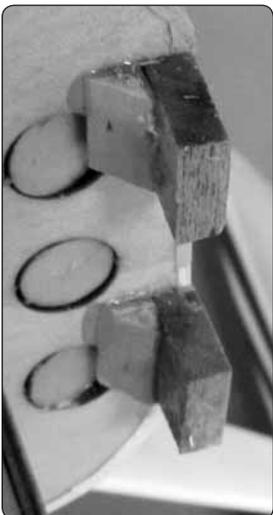
❑ 8. Cut the fuel tubing coming from the tank to the proper length and connect the pressure and carb lines to the engine and muffler. The fill line should be plugged with the included fuel line plug and able to hang free from the bottom of the plane. Be sure to replace the fuel line plug after filling or draining the fuel tank.



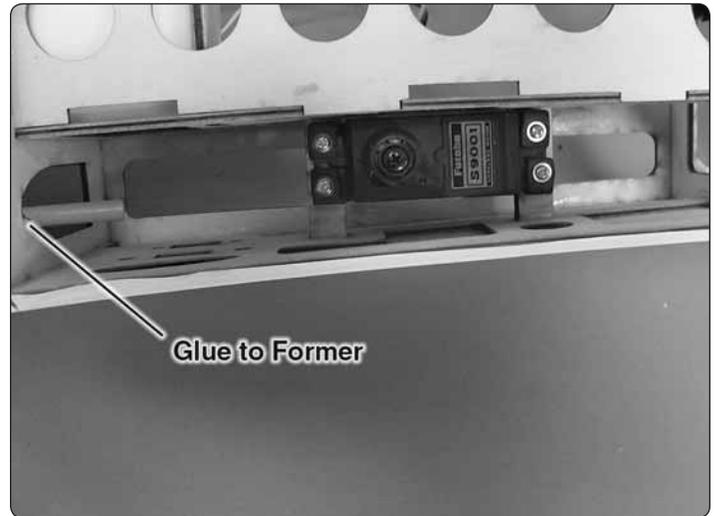
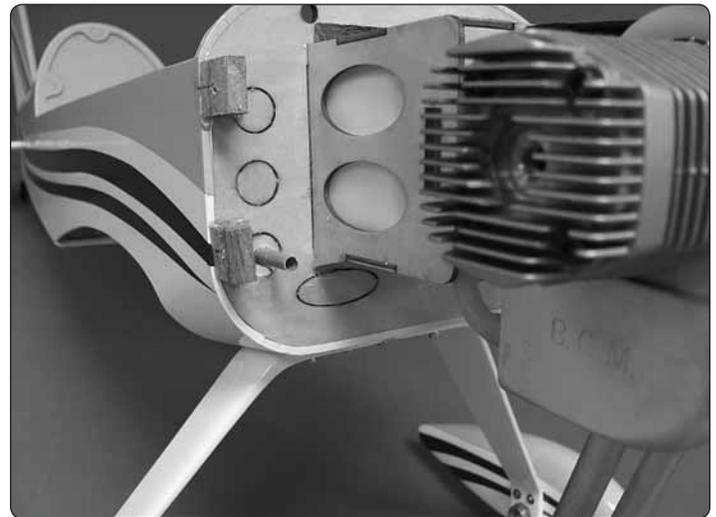
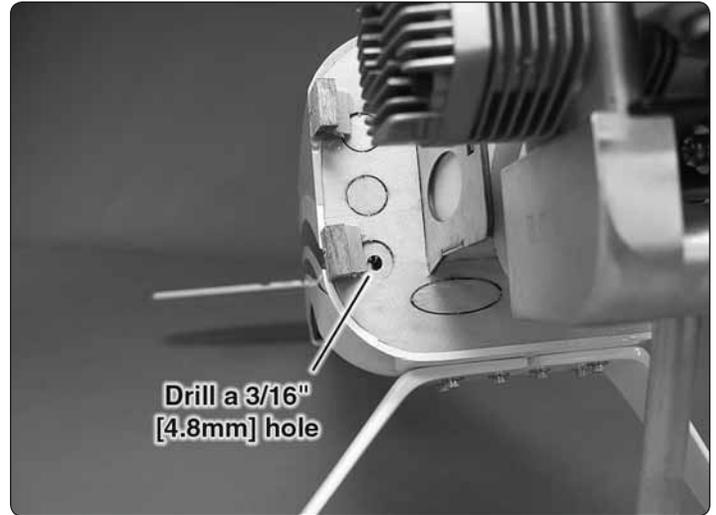
❑ 9. Locate the plywood fuel tank stop. Glue it in place in the slots in the fuselage just behind the fuel tank.



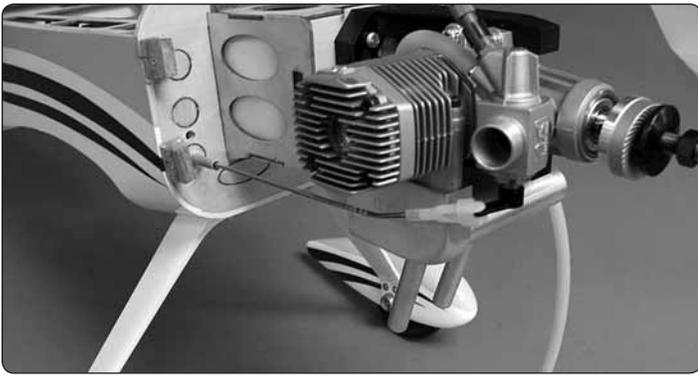
❑ 10. Glue four 1/4" x 5/8" x 5/8" [6mm x 15mm x 15mm] cowl mounting blocks to the fuselage, two on each side as shown in the photo. The block should be mounted flush to the side of the fuselage.



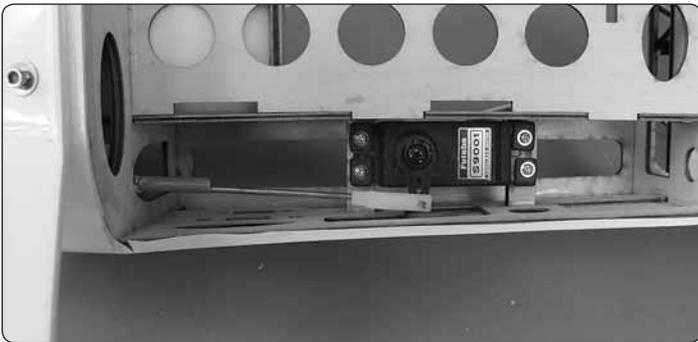
❑ 11. Locate the 1/4" x 1/4" x 2" [6mm x 6mm x 51mm] triangle stock. Cut off four 5/8" lengths and epoxy them to the firewall and the cowl mounting blocks as shown.



❑ 12. Drill a 3/16" [4.8mm] hole through the firewall in line with the engine throttle arm and the throttle servo inside of the fuselage. Cut the plastic 12" [305mm] pushrod tube to a length of 4" [102mm]. Insert it into the hole, passing through the firewall into the fuselage. Glue the tube to the firewall and the former inside of the fuselage.



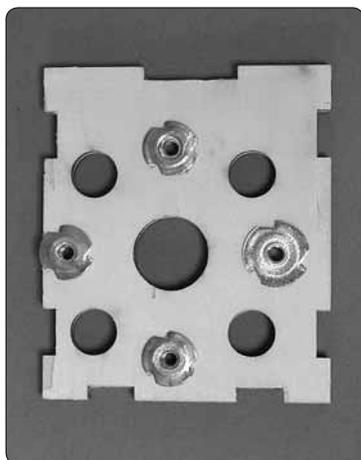
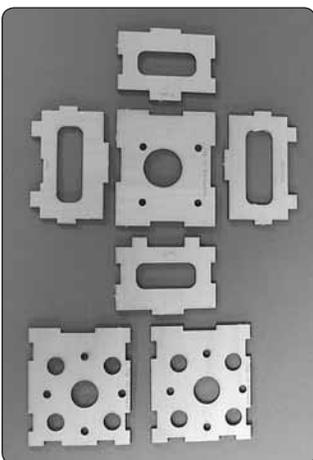
❑ 13. Thread a nylon clevis twenty turns onto the threaded end of the 2-56 x 15-3/4" [400mm] pushrod wire. Slide a silicone clevis retainer over the clevis. Install the wire into the tube and then bend the wire as needed to allow the clevis to attach to the throttle arm. Slide the silicone clevis keeper over the clevis to keep the clevis securely locked.



❑ 14. Center the servo arm and move the throttle arm on the carburetor to half throttle. With the servo arm on the throttle perpendicular to the servo case, mark on the pushrod where it crosses the outer hole of the servo arm. Make a 90 degree bend at your mark and cut the pushrod off 1/4" [6mm] beyond the bend. Hook the pushrod to the throttle servo arm and secure it with a nylon FasLink.

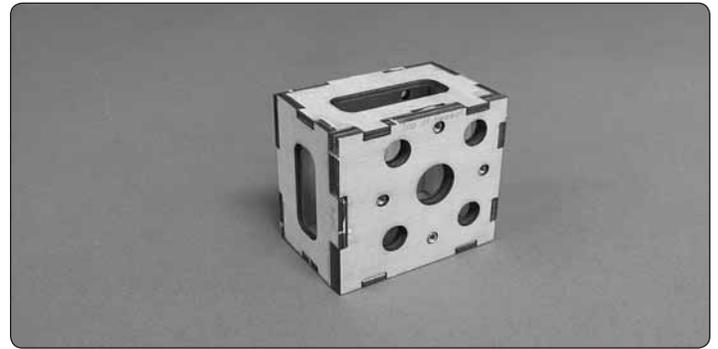
*If you are installing the glow engine, skip ahead to "Install the Cowl!"*

### Install the Electric Motor

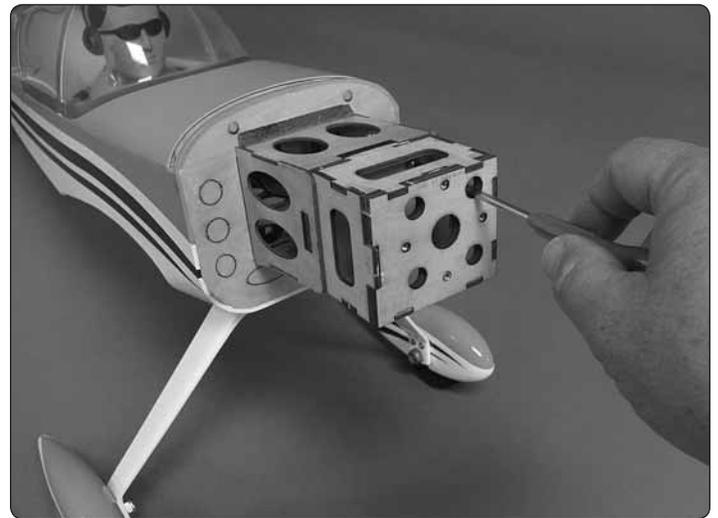


❑ 1. Locate the wood components of the electric motor box. Because of the way the parts have been designed there is only

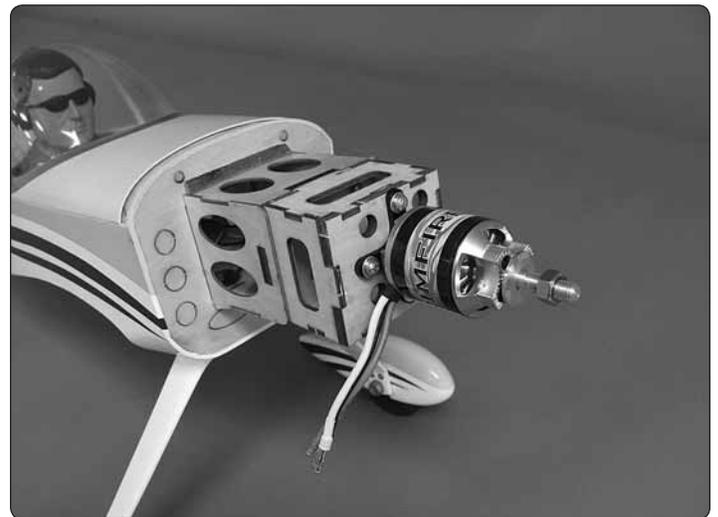
one way the box can be assembled. Begin by gluing the two firewalls together. After the glue has cured install a blind nut into the each of the four holes on the backside of the firewall.



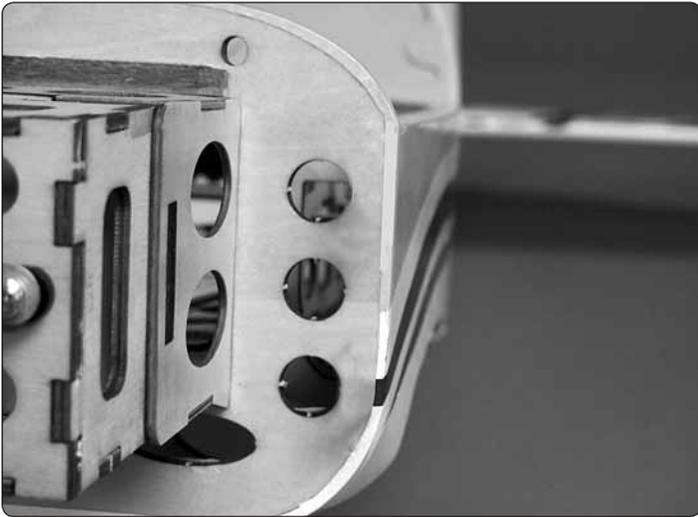
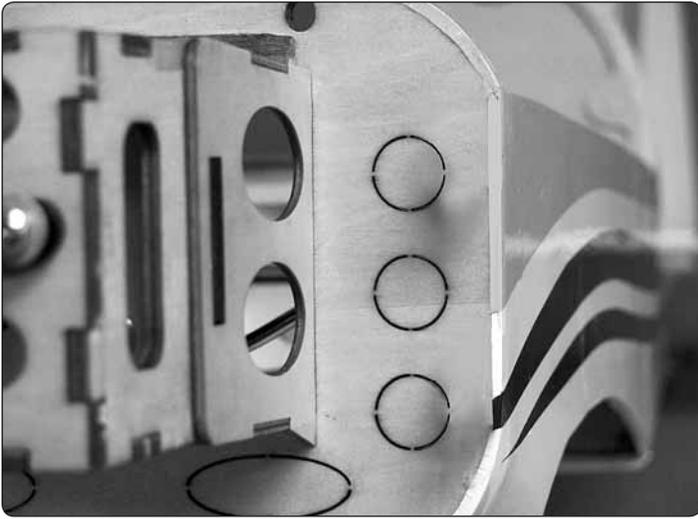
❑ 2. Securely epoxy all of the parts of the box together as shown in the photo.



❑ 3. Mount the box to the fuselage with four #6 x 1/2" [13mm] phillips head screws, #6 flat washers and lock washers. Be sure to apply a drop of thread locker to each of the screws before installing the box.



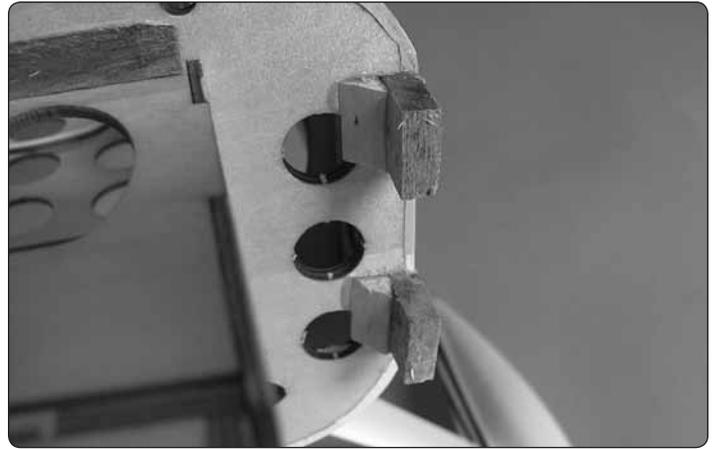
❑ 4. Mount the motor to the wood box with four #6 x 1/2" [13mm] phillips head screws, #6 [4mm] flat washers and lock washers. Be sure to apply a drop of thread locker to each of the screws before installing the motor.



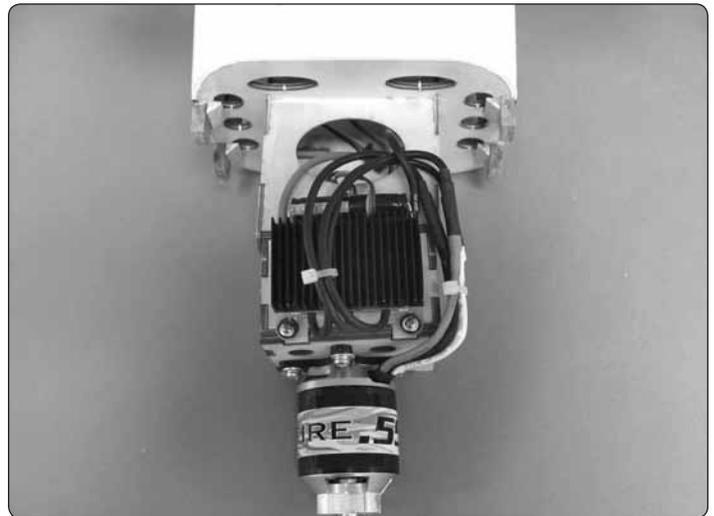
❑ 5. The firewall has eight cooling holes that need to be removed. These can easily be removed by tapping each cooling hole briskly with a small hobby hammer or the end of a screw driver.



❑ 6. Glue four 1/4" x 5/8" x 5/8" [6mm x 15mm x 15mm] cowl mounting blocks to the fuselage, two on each side as shown in the photo. The block should be mounted flush to the side of the fuselage.



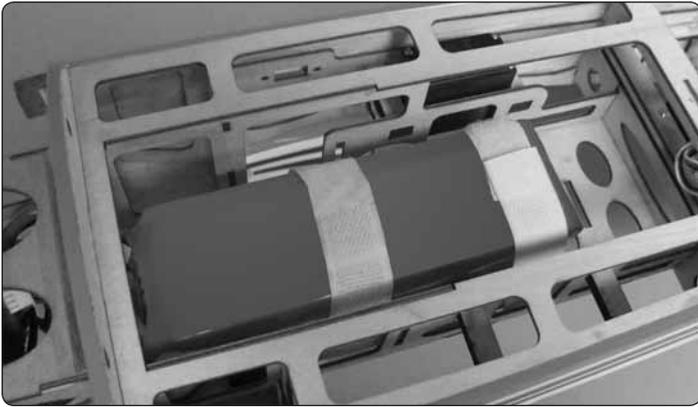
❑ 7. Locate the 1/4" x 1/4" x 2" [6mm x 6mm x 51mm] triangle stock. Cut off four 5/8" lengths and epoxy them to the firewall and the cowl mounting blocks as shown.



❑ 8. Turn the fuselage over and mount the speed control to the bottom of the motor box. Use your own screws or the hardware that came with the speed control. When you complete this model, refer to the instructions with your motor, ESC, and batteries for correct connection instructions.



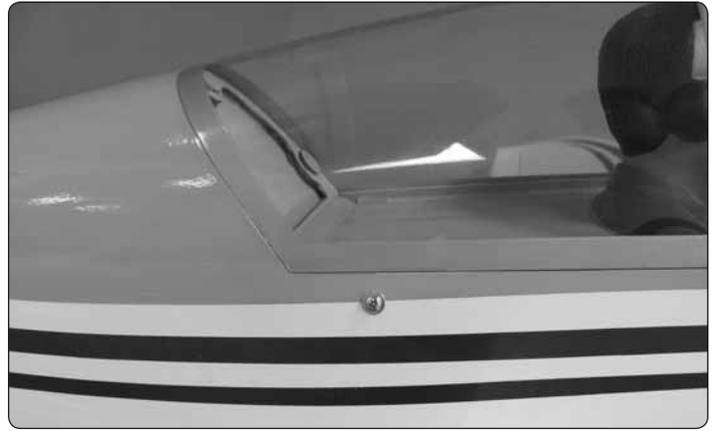
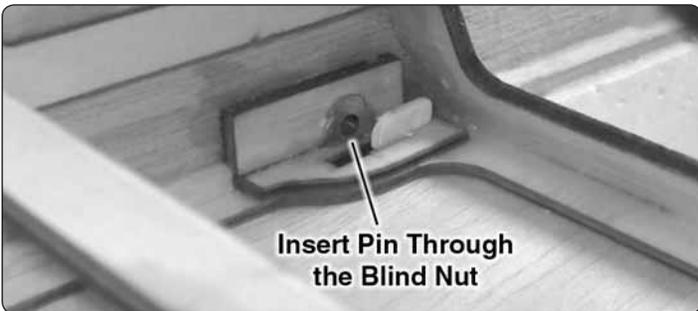
❑ 9. On the bottom of the fuselage, behind the wing saddle you will find cooling exits that are covered. Iron the covering tightly to the fuselage and then cut away the covering, exposing the cooling vents.



□ 10. The batteries are mounted inside of the fuselage. In the bottom of the fuselage install a strip of the self-adhesive Velcro, attaching the hook half of the material to the bottom of the fuselage and the loop side to the batteries. Place the battery into the fuselage. Using the non-adhesive Velcro, secure the battery to the fuselage with two Velcro straps.

### **Optional Method for Securing the Canopy**

You have seen that the canopy mounts with two pins in the leading edge of the canopy frame and hooks in the back of the frame, locking it to the fuselage. The magnets keep the canopy tight to the turtle deck. During our testing this held the canopy securely in place through all of the aerobatic maneuvers we put it through. In flight we never had a canopy come loose. On a couple of occasions we found that the vibration from the idling glow engine caused it to slip forward and the back of the canopy was not secure to the fuselage. This only happened at idle with a glow motor and never occurred with the electric motor installation. Though this did not happen consistently we want you to have a way to be assured it will not come loose. For those of you who have installed the electric motor this is not a concern. You will need easy access to the battery compartment so there is no need to proceed with the following steps. Those of you installing the glow option have very little need to access this area of the fuselage after the construction is complete, so we recommend you complete the following steps.



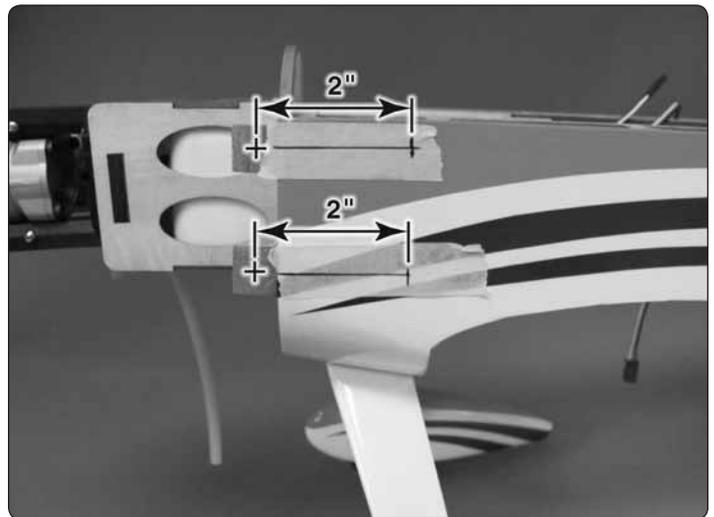
□ 1. Remove the canopy and you will see a blind nut on both sides of the fuselage where the canopy locking tabs extend into fuselage. Insert a pin through the blind nut and through the fuselage sides.

□ 2. Cut away the covering to allow access for the screw to be threaded into the blind nut.

□ 3. Put the canopy in place on the fuselage. Apply a drop of thread locker to the 4-40 x 1/2" [13mm] machine screws. Install a #4 flat washer onto the screw and screw it into the blind nut, tightening it snug to the fuselage side. This screw will stop the canopy from sliding forward.

### **Install the Cowl**

Installing the cowl over the electric motor presents no problem but if you are installing it over the glow engine it takes a bit more effort. In the case of the O.S. engine the carburetor extends out enough that it makes contact with the cowl when you install it over the engine. We chose to remove the carburetor from the engine. This allows the cowl to easily slide over the engine. If you choose not to remove the carburetor you will have to carefully cut away the parts of the cowl that contact the engine.



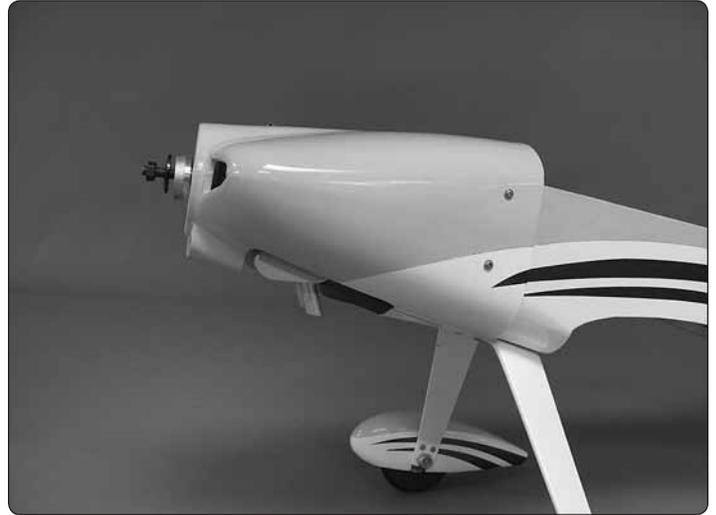
□ 1. Tape a 3" [76mm] piece of masking tape in line with each of the cowl mounting blocks on both sides of the cowl. Draw a 2" [51mm] line from the center of the cowl mounting blocks back towards the fuselage. Do this for all four blocks.



❑ 2. Slide the cowl over the fuselage, centering the cowl with the engine/motor prop flange. On one of the pieces of tape you marked, measure forward 2" [51mm] and make a mark on the cowl. Double check that the cowl is centered with the engine/motor and then drill a 1/16" [1.6mm] hole through the cowl and the cowl mounting block. Secure the cowl with a 5/64" x 1/2" [2mm x 12mm] washer head screw. Re-center the cowl and follow the same procedure for each of the remaining three mounting blocks, re-centering the cowl for each mounting block.

❑ 3. Remove the cowl. Apply a couple drops of thin CA into the holes in the cowl mounting blocks to harden the threads. Allow the glue to fully cure before re-installing the screws.

❑ 4. Re-install the carburetor to the engine. Slide the cowl over the engine, marking where the carburetor makes contact with the cowl. Carefully cut away small portions of the cowl to make clearance for the carburetor and any other portions of the engine that make contact with the cowl. Be sure to cut the hole for the glow plug.



❑ 5. After you have made all of the required clearances remove the cowl, install the muffler and then cut the cowl to make clearance for the muffler. If you removed the carb during these steps, reinstall it and reconnect the throttle linkage.

## Complete the Radio Installation



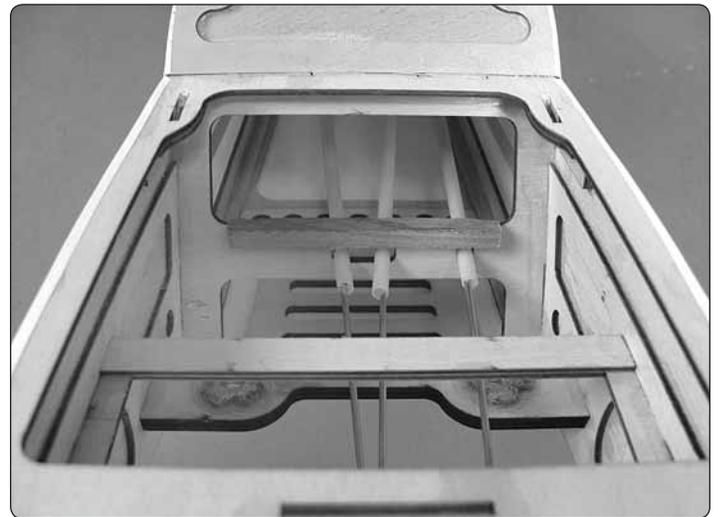
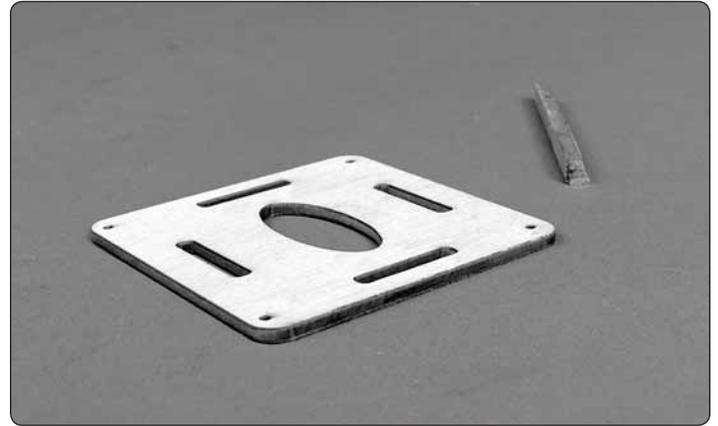
- ❑ 1. Both sides of the fuselage have cut outs for the switch harness and charging jack. Determine which side of the fuselage you wish to mount the switch and charge jack (optional). Cut the covering away from the openings and install the switch harness and charge jack.

You now have to make a decision on where to position your receiver battery. If you install the receiver battery in the location in the next step, your airplane may be nose heavy. If you are installing the electric power option you will be nose heavy. This would be a good time to check the balance of your airplane following the instructions on page 24. If your airplane is nose heavy, you may wish to consider the optional mounting position shown in step 2.

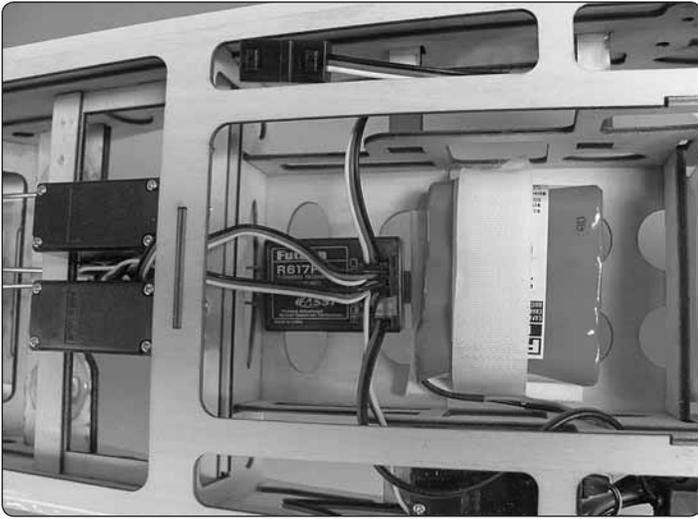


- ❑ 2. Insert the included Velcro strap through the slots in the fuselage. Place a piece of R/C foam under the receiver battery and secure it with the Velcro strap.

## Optional Receiver Battery Installation Location



Locate the plywood receiver battery tray and the shaped hardwood stick. Glue the angled face of the shaped stick to the former just above the pushrod tubes. When the glue has hardened place the battery tray on the servo rail and the shaped stick. Drill a 1/16" [1.6mm] hole through the holes in the tray, into the servo mounting rail and the shaped stick. Secure the tray with four 5/64" x 3/8" [2 x 10mm] washer head wood screws. Insert the included Velcro strap through the slots in the tray. Place a piece of R/C foam under the receiver battery and secure it with the Velcro strap.



❑ 3. Cut a piece of the included adhesive backed Velcro to fit your receiver and place it on the bottom of the receiver. Peel off the remaining backing paper and place the receiver into the fuselage. Connect the battery to the switch harness, making sure to secure the connection with heat shrink tubing, tape or some other method to keep the connection secure. Plug the servos into the receiver following the instructions for your brand of radio. Be sure to route your receiver antenna as specified in the instructions with your radio system.

❑ 4. Now is a good time to turn on the radio and adjust the servo linkages for the control surfaces and the throttle connection.

### Finishing Touches



❑ 1. Install the spinner and prop for your engine or motor system.

### Apply the Decals

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

❑ 2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water—about one teaspoon of soap per gallon of water. Submerge the decal in the soap and water and peel off the paper backing. **Note:**

Even though the decals have a “sticky-back” and are not the water transfer type, submersing them in soap & water allows accurate positioning and reduces air bubbles underneath.

❑ 3. Position 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.

**IMPORTANT:** Before experimenting with different battery combinations and connecting multiple battery packs with adapter plugs, refer to the Battery Precautions below.

## GET THE MODEL READY TO FLY

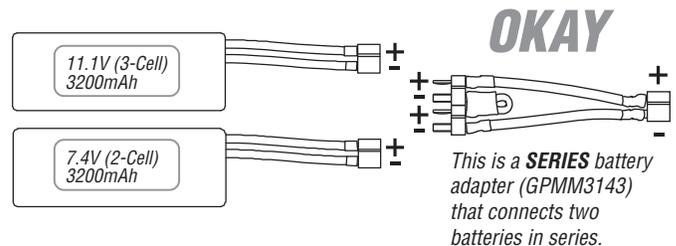
### Install & Connect the Motor Battery

Before you can power the radio system and set up the controls, the motor batteries will need to be charged. **IMPORTANT:** If using multiple battery packs that are connected with an adapter, never charge the batteries together through the adapter. Always charge each battery pack separately. Charge the batteries, then read the following precautions on how to connect multiple packs for flying the model:

### Battery Precautions

There are two ways to connect multiple battery packs: In **Series** and in **Parallel**.

*These are two 3200mAh batteries (one 11.1V and the other 7.4V). When joined in **SERIES**, the result will be a 18.5V, 3200 mAh battery.*

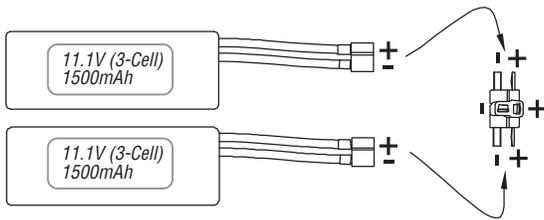


*It's okay to connect batteries with different voltages in series to achieve the new, desired voltage.*

1. Connecting batteries in “**Series**” means to connect the +’s to the –’s and the –’s to the +’s. This combines the battery’s Voltages, but the capacity remains the same.

These two 1500mAh batteries (both 11.1V) are being joined in **PARALLEL**. The result will be one **11.1V, 3000mAh** battery.

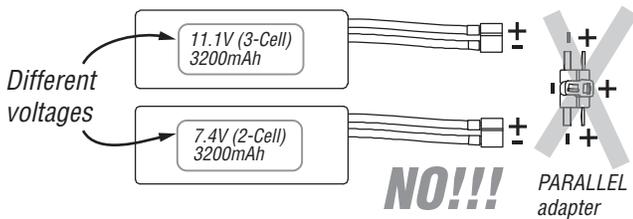
**OKAY**



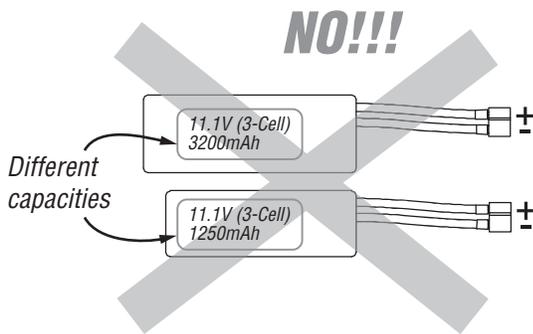
This is a **PARALLEL** battery adapter (GPMM3142) that connects two batteries in parallel.

2. Connecting batteries in “**Parallel**” means to connect the +’s to the +’s and the -’s to the -’s. This combines the battery’s capacities, but the Voltage remains the same.

**NEVER** connect battery packs with different Voltages in Parallel—only combine in Series. Otherwise, the batteries will try to “equalize” with the larger one trying to “charge” the smaller one, thus causing heat and likely a fire.



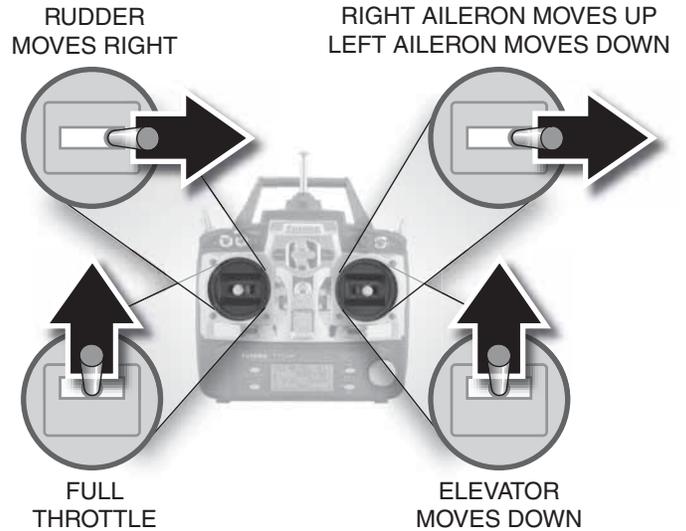
Also **NEVER** connect battery packs with different capacities in Series or in Parallel.



### Check the Control Directions

1. Turn on the transmitter and receiver and center the trims. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the screws that hold on the servo arms.
2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to center the control surfaces.

### 4-CHANNEL RADIO SET UP (STANDARD MODE 2)



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

### Set the Control Throws

To ensure a successful first flight, set up your F-1 Rocket according to the control throws specified in this manual. The throws have been determined through actual flight testing and accurate record-keeping allowing the model to perform in the manner in which it was intended. If, after you have become accustomed to the way the F-1 Rocket flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model too responsive and difficult to control, so remember, “more is not always better.”

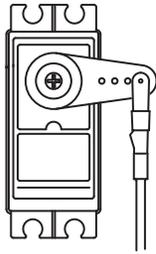
1. Hold a ruler vertically on your workbench against the widest part (front to back) of the trailing edge of the elevator. Note the measurement on the ruler.



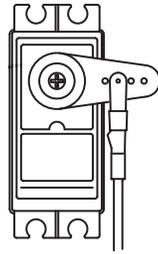
2. Move the elevator up with your transmitter and move the ruler forward so it will remain contacting the trailing edge. The distance the elevator moves up from center is the “up” elevator throw. Measure the down elevator throw the same way.

## At the Servos

The pushrod farther out means **More Throw**

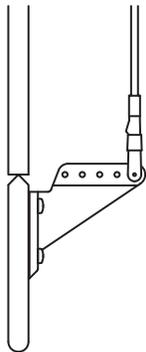


The pushrod closer in means **Less Throw**

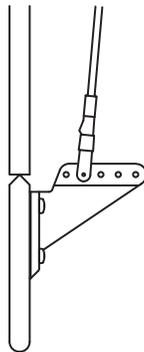


## At the Control Surfaces

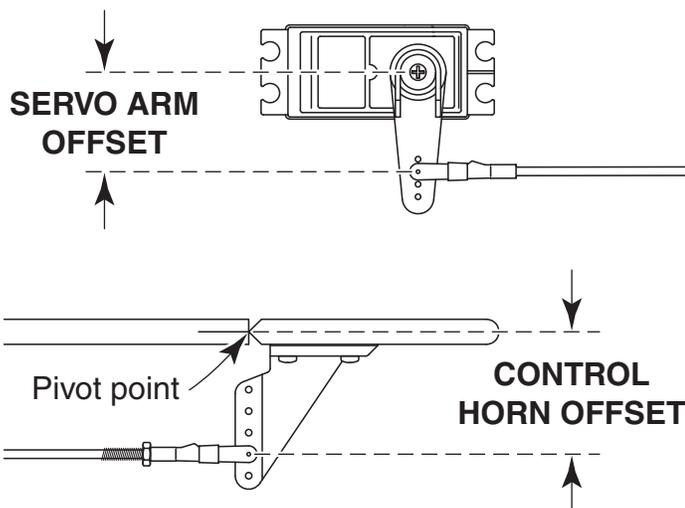
The pushrod farther out means **Less Throw**



The pushrod closer in means **More Throw**



- 3. If necessary, adjust the location of the pushrod on the servo arm or on the elevator horn, or program the ATVs in your transmitter to increase or decrease the throw according to the measurements in the control throws chart.



- 4. When connecting pushrods and setting up your control throws, it is **critically important** to use proper pushrod geometry—that is the distance from the pushrod on the servo arm to the center of the output shaft (**servo arm offset**) compared to the distance from the pushrod on the control horn to the pivot point (**control horn offset**).

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

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

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

These are the recommended control surface throws:		
	<b>LOW</b>	<b>HIGH</b>
<b>ELEVATOR</b> Up & Down	1/2" [13 mm] 12°	7/8" [22 mm] 20°
<b>RUDDER</b> Right & Left	1" [25 mm] 15°	1-1/2" [38 mm] 24°
<b>AILERONS</b> Up & Down	1/4" [6 mm] 12°	7/16" [11 mm] 20°

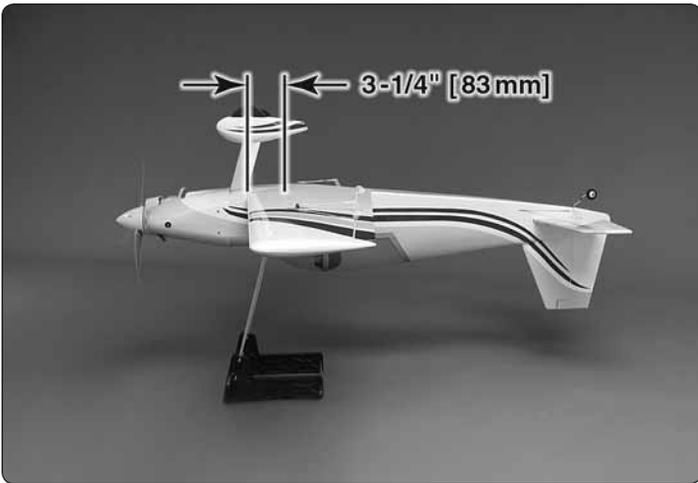
## Balance the Model (C.G.)

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

At this stage the model should be in ready-to-fly condition with **all** of the components in place including the complete radio system, engine, muffler, propeller, spinner and pilot. If you've built the electric version, install the motor battery. If you've built the glow version the fuel tank should be empty.

- 1. If using a Great Planes C.G. Machine, set the rulers to 3-1/4" [83 mm]. If not using a C.G. Machine, use a fine-point felt tip pen to mark lines on the top of wing on both sides of the fuselage 3-1/4" [83 mm] back from the leading edge. Apply narrow (1/16" [2 mm]) strips of tape over the lines so you will be able to feel them when lifting the model with your fingers.

This is where your model should balance for the first flights. Later, you may experiment by shifting the C.G. 1/2" [13 mm] forward or 7/16" [11 mm] back to change the flying characteristics. Moving the C.G. forward will improve the smoothness and stability, but the model will then be less aerobatic (which may be fine for less-experienced pilots). Moving the C.G. aft makes the model more maneuverable and aerobatic for experienced pilots. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



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

❑ 3. If the tail drops, the model is “tail heavy.” If possible, move the battery pack and/or receiver forward to get the model to balance. If the nose drops, the model is “nose heavy.” If possible, move the battery pack and/or receiver aft. If the receiver and/or battery cannot be moved, or if additional weight is still required, nose weight may be easily added by using “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, or if tail weight is required, use Great Planes “stick-on” lead (GPMQ4485). To find out how much weight is required, place incrementally increasing amounts of weight on the bottom of the fuselage over the location where it would be mounted inside until the model balances. A good place to add stick-on nose weight is to the firewall. Do not attach weight to the cowl—this will cause the mounting screws to open up the holes in the cowl. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added by cutting open the bottom of the fuse and gluing it permanently inside.

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

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

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

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

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

## ***PREFLIGHT***

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

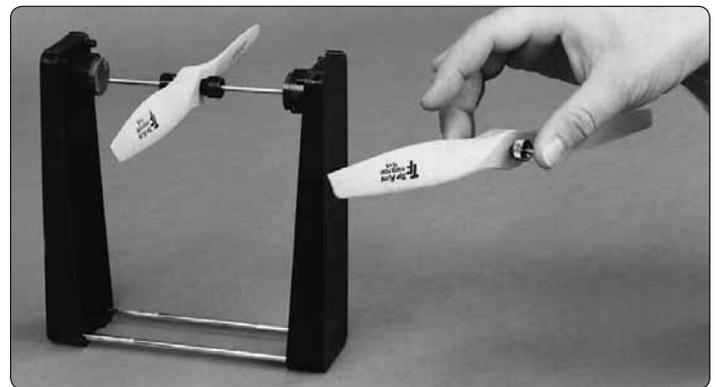
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 28 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 and Range Check

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

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

Make all engine adjustments from behind the rotating propeller.

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

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

## AMA SAFETY CODE

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.**

## CHECKLIST

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

- 1. Fuelproof all areas exposed to fuel or exhaust residue such as the cowl ring, cowl mounting blocks, wing saddle area, etc.
- 2. Check the C.G. according to the measurements provided in the manual.
- 3. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.
- 4. Extend your receiver antenna and make sure it has a strain relief inside the fuselage to keep tension off the solder joint inside the receiver.
- 5. Balance your model *laterally* as explained in the instructions.
- 6. Use threadlocking compound to secure critical fasteners such as the set screws that hold the wheel axles to the struts, screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.
- 7. Add a drop of oil to the axles so the wheels will turn freely.
- 8. Make sure all hinges are **securely** glued in place.
- 9. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, cowl mounting screws, etc.).
- 10. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- 11. Pull on each of the control surfaces to ensure that all of the hinges are secure. If any are loose, apply thin CA to the hinge and allow it to fully cure. **Do not use accelerator!**

- 12. 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.
- 13. 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.
- 14. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- 15. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.
- 16. Make sure the fuel lines are connected and are not kinked.
- 17. Balance your propeller (and spare propellers).
- 18. Tighten the propeller nut and spinner.
- 19. Place your name, address, AMA number and telephone number on or inside your model.
- 20. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
- 21. If you wish to photograph your model, do so before your first flight.
- 22. Range check your radio when you get to the flying field.

## FLYING

The F-1 Rocket is a great-flying model that flies smoothly and predictably. The F-1 Rocket does not, however, possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

### Fuel Mixture Adjustments

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

**CAUTION (THIS APPLIES TO ALL R/C AIRPLANES):** If, while flying, you notice an alarming or unusual sound such as a low-pitched "buzz," this may indicate control surface *flutter*. Flutter occurs when a control surface (such as an aileron or elevator) or a flying surface (such as a wing or stab) rapidly vibrates up and down (thus causing the noise). In extreme cases, if not detected immediately, flutter can actually cause the control surface to detach or the flying surface to fail, thus causing loss of control followed by an impending crash. The best thing to do when flutter is detected is to slow the model **immediately** by reducing power, then land as soon as safely possible.

Identify which surface fluttered (so the problem may be resolved) by checking all the servo grommets for deterioration or signs of vibration. Make certain all pushrod linkages are secure and free of play. If it fluttered once, under similar circumstances it will probably flutter again unless the problem is fixed. Some things which can cause flutter are; Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of wire pushrods caused by large bends; Excessive free play in servo gears; Insecure servo mounting; and one of the most prevalent causes of flutter; Flying an over-powered model at excessive speeds.

## Takeoff

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

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

## Flight

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

Take it easy with the F-1 Rocket for the first few flights, gradually getting acquainted with it as you gain confidence. Adjust the trims to maintain straight and level flight. The Rocket is a very fast airplane. Its clean airframe allows it to fly very fast, yet it exhibits good slow flight characteristics as well. Don't let the airplane get ahead of your skills. Fly the airplane at a speed you are comfortable with. After flying around for a while, and while still at a safe altitude with plenty of fuel, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how she climbs as well. Continue to fly around, executing various maneuvers and making mental notes (or having your assistant write them down) of what trim

or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your fuel/battery 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. Because of its clean airframe you may find that you overshoot your first landing. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and climb out to make another attempt. When you're ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, hold up elevator to place the tail on the ground, regaining tail wheel control.

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

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

**GOOD LUCK AND GREAT FLYING!**

This model belongs to:	
	Name
	Address
	City, State, Zip
	Phone Number
	AMA Number