



RIFLE

INSTRUCTION MANUAL

SPECIFICATIONS

Wingspan: 31 in [785mm]
Wing Area: 112 in² [7.2 dm²]
Wing Loading: 21.9–23.1 oz/ft² [67–70 g/dm²]
Length: 24.5 in [620mm]

Weight: 17–18 oz [480–510 g]
Radio: 3-channel, 2 nano servos, mini receiver
Motor, ESC, Battery: 24-33-3180kV Ammo inrunner,
25A ESC, 1500mAh 11.1V 25C LiPo

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

Thank you for purchasing the Great Planes Rifle ARF. Prepare to be thrilled! Before flying your Rifle make sure you're really ready; get a good night's sleep and do what you can to optimize your reaction time and concentration level, because the Rifle's small size and extreme speed can cause it to get out of visual range within a few seconds! We've clocked it at average speeds of 90mph, but in actuality it seems like it's going over 200! The Rifle does fly predictably and smoothly, so TOC (Tournament of Champions) skills are not required, but you still must be a competent pilot with the ability to remain calm and react decisively when being challenged. And even after you get used to your Rifle, you'll

still breathe a sigh of relief after every landing, but you'll become addicted to the speed and be ready for the next flight after you've calmed your nerves.

For the latest technical updates or manual corrections to the Rifle visit the Great Planes web site at www.greatplanes.com. Open the "Airplanes" link, then select Rifle 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.

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

1. Your Rifle 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 Rifle, 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 motor, 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 a motor larger than recommended 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 fuselage, wing and horizontal stabilizer 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 Rifle that may require planning or decision making before starting assembly. Order numbers are provided in parentheses.

Motor, Battery and ESC

The Rifle was designed for and tested exclusively with the:

- **ElectriFly Ammo™ 24-33-3180kV inrunner brushless motor** (GPMG5155)

This motor provided straight-and-level average speeds of 90mph.

There are two different batteries suitable for the Rifle. Due to its larger capacity the:

- **ElectriFly 11.1V (3S) 1500mAh 25C Power Series LiPo** (GPMP0511)

is preferred, but the:

- **ElectriFly 11.1V (3S) 1300 mAh 25C Power Series LiPo** (GPMP0505)

is also suitable because it is only slightly less in capacity and is also .5 oz [14g] lighter.

If purchasing several batteries for your Rifle, it may be a good idea to purchase at least one lighter battery, allowing your Rifle to be slightly more maneuverable and land slightly slower which may be beneficial at least for the first flight.

Under "normal" flying conditions (mostly full throttle), average flight times are approximately four minutes of motor run time (with approximately one more minute for multiple landing attempts).

The:

- **Great Planes ElectriFly SS-25 25 Amp brushless ESC** (GPMM1820)

is also recommended.

Servos, Receiver

No unusual radio gear is required for the Rifle, just a small receiver and one elevator servo and aileron servo in the 15-20 oz-in torque range that will fit in the mounts.

Servos used in the prototypes for testing were both the:

- **Great Planes ES50 Nano servos** (GPMM1210)

and the

- **Futaba® S3107 servos** (FUTM0025).

Any mini 4-channel aircraft receiver will work. A Futaba 2.4GHz R617FS FASST™ receiver (FUTL7627) was also used in the prototypes and is illustrated in the instruction manual.

Propeller

The Rifle was flown exclusively with an:

- **APC 4.75 x 4.75 Speed 400 electric propeller** (APCQ4910)

You should also have several spare propellers on-hand to replace ones that break upon landing.

ADDITIONAL ITEMS REQUIRED

Battery Charger

- A LiPo-capable battery charger and a power source for the charger is required. One recommended charger is the Great Planes *ElectriFly* TritonEQ™ AC/DC Charger (GPMM3155). The TritonEQ can be powered either by an AC or DC power source and features a built-in LiPo cell balancer.
- Another suitable LiPo battery charger is the Great Planes PolyCharge4™ DC LiPo charger (GPMM3015). The PolyCharge4 can charge up to four LiPo batteries at the same time, but requires separate LiPo cell balancers, so for each LiPo battery you wish to charge simultaneously (up to 4), one Great Planes Equinox™ LiPo Cell Balancer (GPMM3160) will be required. The Equinox comes with 2S and 3S charge adapters, so these will be suitable for the batteries recommended for your Rifle. Finally, the PolyCharge4 does not have AC capability, so if wall-charging from home is a priority a separate A/C 12-Volt power source must also be purchased. A suitable power supply then for the PolyCharge4 is the Great Planes 12V 12A DC power supply (GPMP0901).

Adhesives and Building Supplies

Other than common hobby tools this is the list of adhesives and building supplies that are required to finish the Rifle.

- 1/2 oz. [15g] Thin Pro™ CA (GPMR6001)
- CA applicator tips (HCAR3780)
- 2 oz. [59mL] spray CA activator (GPMR6035)
- Threadlocker thread locking cement (GPMR6060)
- Stick-on segmented lead weights (GPMQ4485)
- 1/16" [1.6mm] drill

Optional Supplies

- Du-Bro® double-sided tape (DUBQ3551—for mounting ESC, receiver)
- Shoe Goo™ (DTXC2460—for securing servo wires)
- Great Planes Velcro® (GPMQ4480—for additional batteries)

KIT INSPECTION

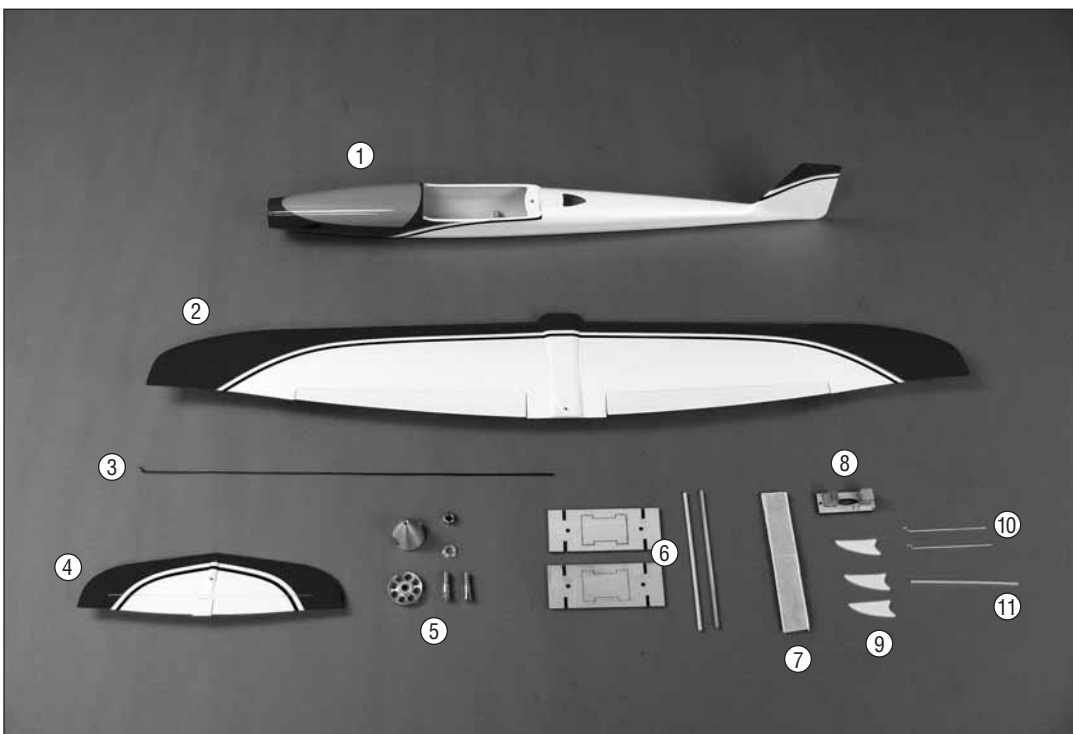
Before starting to build, take an inventory of this kit to make sure it is complete, and inspect the parts to make sure they are of acceptable quality. If any parts are missing or are not of acceptable quality, or if you need assistance with assembly, contact **Product Support**. When reporting defective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

Great Planes
Product Support
3002 N Apollo Drive, Suite 1
Champaign, IL 61822

Ph: (217) 398-8970, ext. 5
Fax: (217) 398-7721

E-mail: airsupport@greatplanes.com

KIT CONTENTS



1. Fuselage
2. Wing
3. Elevator pushrod
4. Horizontal stabilizer
5. Spinner
(cone, back plate, shaft, washer, nut, spare shaft)
6. Balancing stand
7. Adhesive-back hook & loop material
8. Elevator servo mount
9. Landing skids
10. Aileron pushrods
11. Antenna guide tube

ORDERING REPLACEMENT PARTS

Replacement parts for the Great Planes Rifle 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.

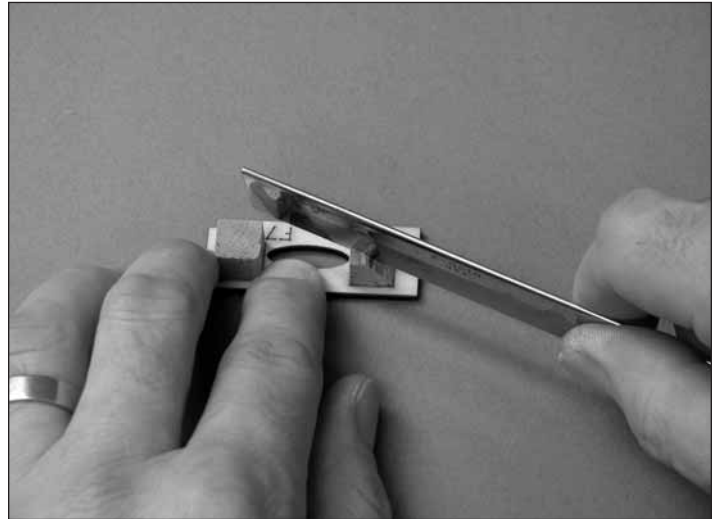
REPLACEMENT PARTS LIST

Order No.	Description
GPMA2720	Wing
GPMA2721	Fuselage
GPMA2722	Horizontal Stabilizer
GPMA2723	Spinner Set
GPMA2724	Decal Sheet
NOTE ▶	Full-size plans are not available. You can download a copy of this manual at www.greatplanes.com .

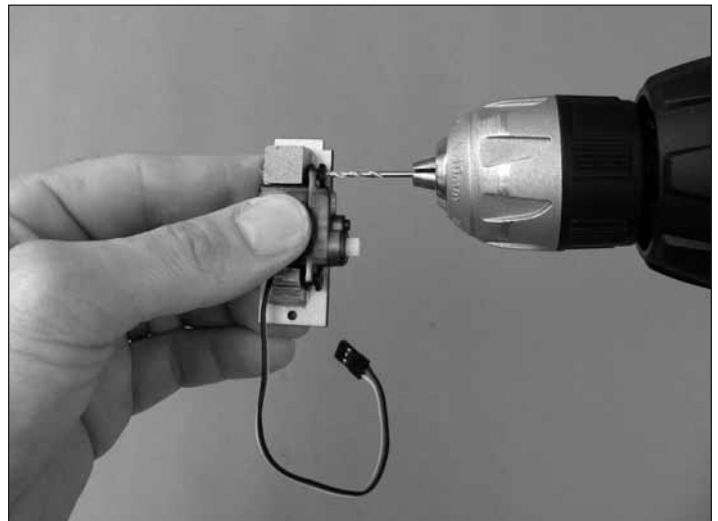
- The stabilizer and wing incidences and engine thrust angles have been factory-built into this model. However, some technically-minded modelers may wish to check these measurements anyway. To view this information visit the web site at www.greatplanes.com and click on "Technical Data." Due to manufacturing 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.

ASSEMBLY INSTRUCTIONS

Hook Up the Elevator

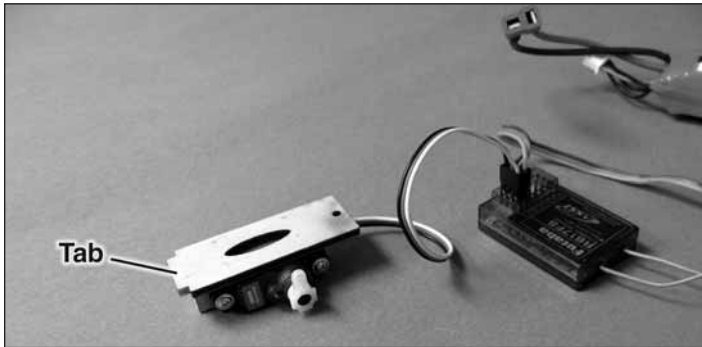
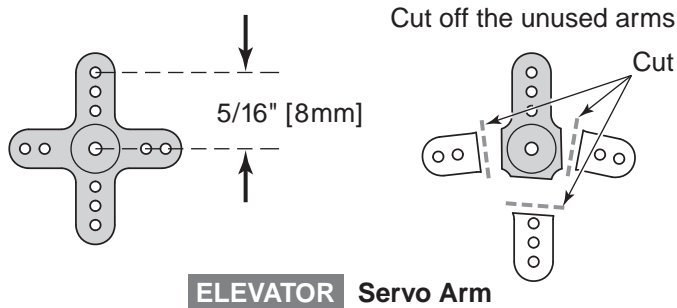


- 1. Test fit your elevator servo to the **servo mount**. If necessary, trim the mount to fit the servo—it will probably be necessary to trim a portion of one of the blocks to accommodate the servo wire.

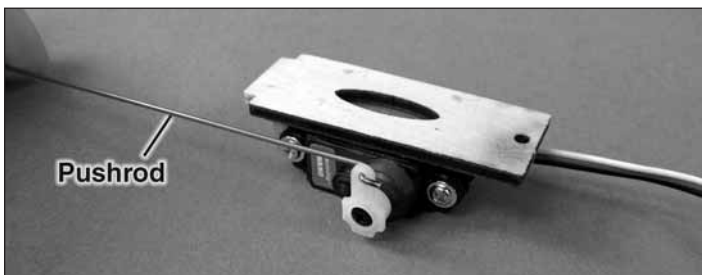


- 2. Place your servo in the mount and drill 1/16" [1.6mm] holes through the blocks for the mounting screws.
- 3. Mount the servo with the screws included with this kit (or the screws that came with your servo).
- 4. Remove the servo from the mount, add a few drops of thin CA to screw holes and allow to harden. Remount the servo.

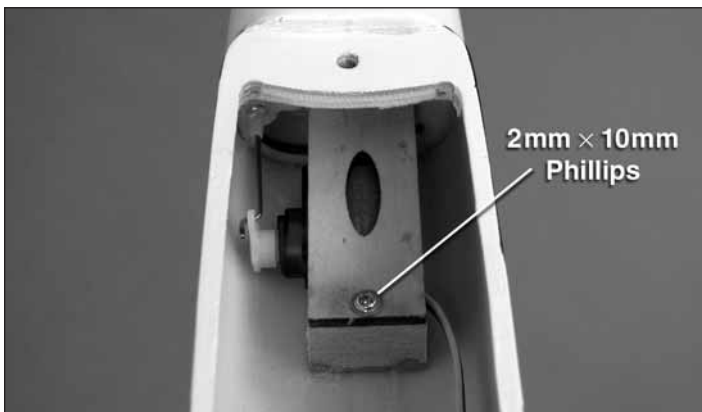
The servo has to be centered before mounting the servo arm, so temporarily hook up the radio and center the servo as described...



- ❑ 5. Connect your ESC and elevator servo to your receiver. Turn on your transmitter, center the trims and connect a battery to the ESC so the servo will center. Temporarily fit a servo arm that has holes 5/16" [8mm] out from center to the servo so it will be 90 degrees (this will be the longer two of the four arms on the small servo arm that comes with the Futaba and ElectrIFly ES50 Nano servo). Take off the arm, cut off the unused arms, then mount the servo arm to the servo with the mounting screw.

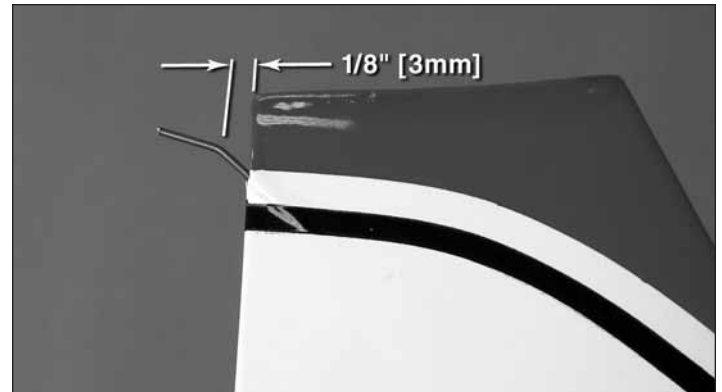


- ❑ 6. Connect the elevator pushrod to the elevator servo arm as shown.

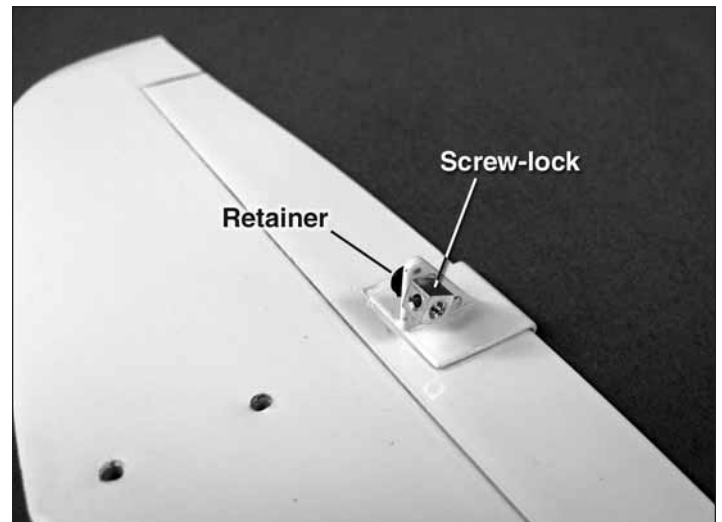


- ❑ 7. Guide the elevator pushrod down through the guide tube in the fuselage and mount the elevator servo by keying

the tab in the back of the mount into the former and holding down the front with one of the 2mm x 10mm Phillips wood screws included with this kit.



- ❑ 8. With the elevator servo centered, use flat-nose pliers to bend the pushrod 1/8" [3mm] from the trailing edge of the vertical stabilizer (fin) where shown.



- ❑ 9. Connect one of the aluminum screw-lock connectors to farthest-in hole in the elevator control horn on the elevator.



- ❑ 10. Fit the elevator pushrod into the screw-lock connector and mount the horizontal stabilizer (stab) to the fin with the two 2mm x 8mm counter-sink Phillips flat-head screws. **Note:** Obviously, the stab must be securely mounted. While

tightening the screws, make certain they are getting a good “bite” into the fin and that they can be tightened securely. You may be tempted to permanently glue the stab into position, but all of our rigorous testing proved that this was not necessary as all of our prototypes depended upon the screws only. If your screws don’t seem to get an adequate bite, remove the screws, add a few drops of thin CA down into the screw holes in the top of the fin, allow to thoroughly harden, and then remount the stab with the screws.

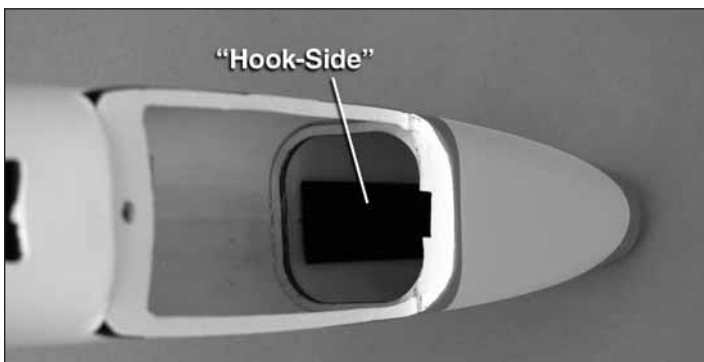


□ 11. Temporarily connect the servo to your receiver and power the system up. With the servo and elevator centered temporarily lock the pushrod to the screw-lock with a 2mm screw. Use your transmitter to move the elevator. Make sure it moves smoothly and that you can get the 3/16" [5mm] (13°) of up and down elevator throw as specified on page 12. Make any adjustments necessary to the bend in the wire and cut off excess wire.

□ 12. Once satisfied with the elevator movement, remove the screw, add a drop of threadlocker, reinstall the screw and securely tighten.

Note: If for some reason you ever need to make another elevator pushrod, use K&S .039" [1mm] music wire.

Install the Motor



□ 1. Cut the rougher, “hook” side of the included hook & loop material to a length of 3" [75mm]. Apply the strip inside the bottom of the fuselage just ahead of the front former. Use the butt end of a small screwdriver or something similar

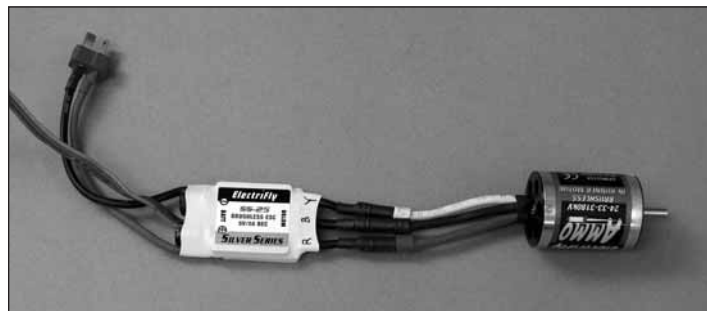
to thoroughly “rub” the strip down onto the bottom of the fuselage. Apply a **few** drops of thin CA around the edges of the strip to make sure it never comes up.



□ 2. While you’ve got your hook & loop material out, attach a matching strip of the softer, “loop” side to your battery.

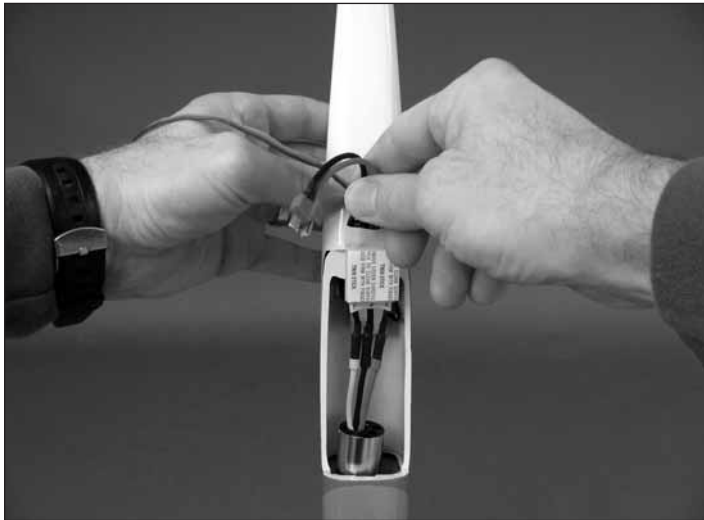


□ 3. **Optional:** Shortening the ESC wires will remove excess wire from the battery compartment, making it easier to install and remove the battery. If you don’t feel like shortening the wires you can just coil them up inside the roof of the fuselage behind the motor. To shorten the wires, remove the protective shrink tubing from the connectors on the ESC, de solder the connectors, cut the wires so the ends of the connectors will be 1" [25mm] from the end of the ESC and re solder the connectors—don’t forget to apply new pieces of shrink tubing.

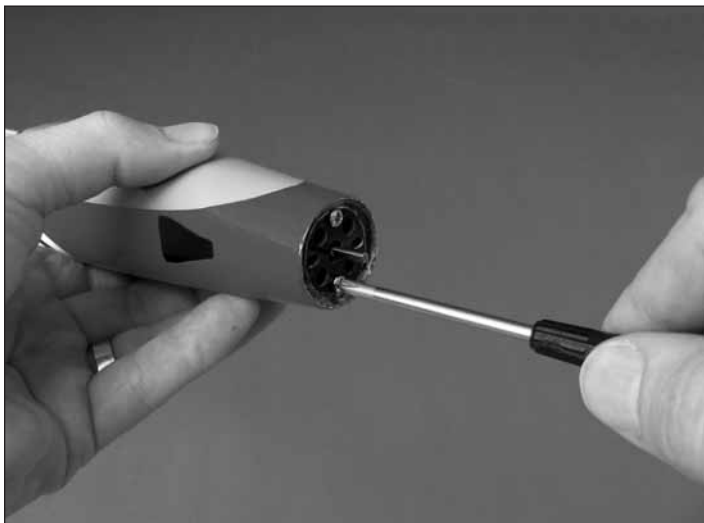


□ 4. Connect the ESC to your motor and connect the ESC to the receiver. Turn on your transmitter and reverse the throttle channel. Connect the battery to the ESC and advance the throttle to make sure the motor is turning in the correct direction. If the motor is not turning the correct direction, switch any two motor/ESC wires with each other to change the direction.

- ❑ 5. Apply double-sided foam adhesive mounting tape or the adhesive hook & loop material to the ESC so it can be mounted inside the top of the fuselage.



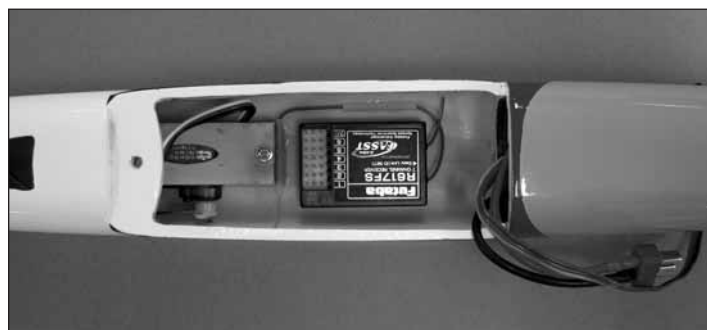
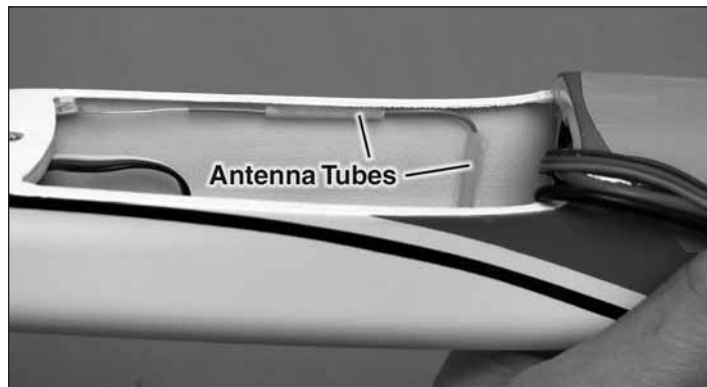
- ❑ 6. Drop the motor and ESC down into the fuselage so the motor shaft comes out the hole in the middle of the motor mount. Note that the motor is mounted with the wires on top so the ESC can also be mounted in the top of the fuselage, leaving room for the battery on the bottom of the fuselage. You should be able to stick your pinky finger through one of the openings in the side of the fuselage to rotate the motor so the threaded screw holes align with the mounting holes in the mount.



- ❑ 7. Mount the motor to the firewall with the 3mm screws that came with the motor and a drop of threadlocker. Stick the ESC to the top of the fuselage.

Do not mount the propeller until instructed to do so after the control throws have been set.

Mount the Receiver

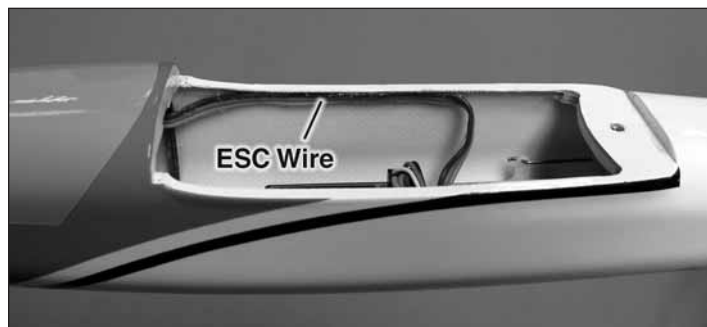


Refer to these two photos while mounting the receiver.

- ❑ 1. Use the included, double-sided adhesive hook & loop material or double-sided foam adhesive mounting tape to mount the receiver to the bottom of the fuselage—mount it as far aft as you can (making room for the antenna if necessary) so it will not interfere with removal and installation of the motor battery.

- ❑ 2. If using a Futaba FASST receiver with dual antennas (or another similar receiver with short antennas), use coarse sandpaper to roughen the included 4" [100mm] **antenna tube** so glue will adhere. Cut pieces from the tube to the appropriate lengths and glue them to the inside of the fuselage for securing the antennas.

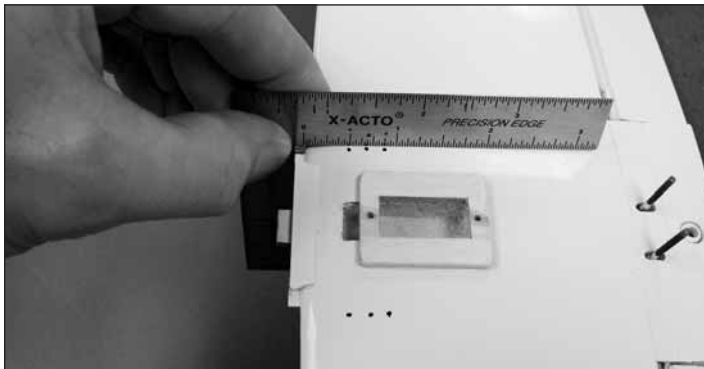
- ❑ 3. If using a 72MHz receiver that has a longer, "whip" antenna, drill a small hole near the end of the fuselage and guide the antenna down through the fuselage and out the hole.



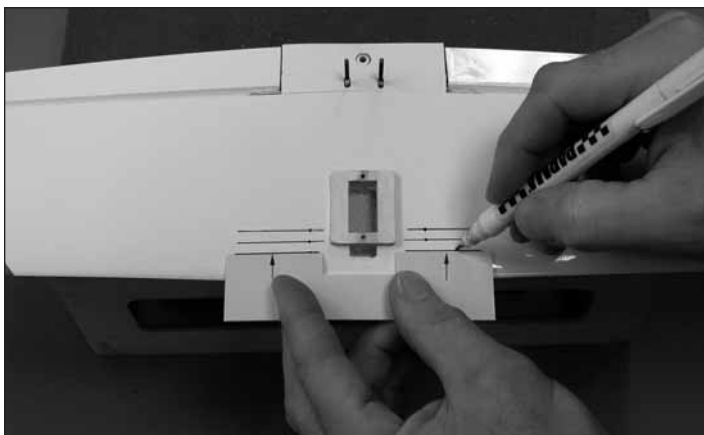
- ❑ 4. While you're down inside the fuselage connect the elevator servo wire and the ESC wire to the receiver. We

also used Shoe Goo to glue the ESC wire to the side of the fuselage so it wouldn't get in the way of the battery or aileron servo. Other, non-permanent adhesive such as RTV silicone would also be suitable for this.

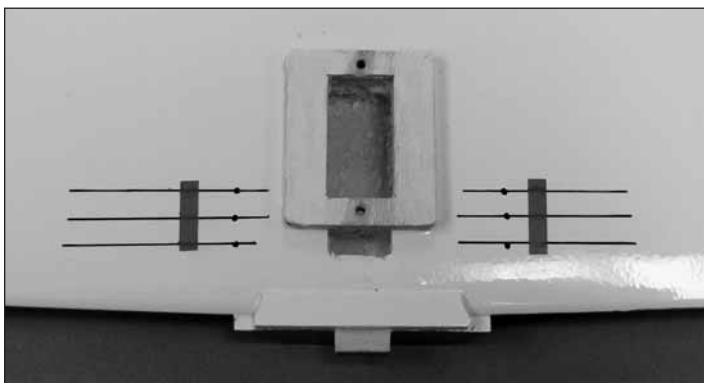
Mark the Balance Range



- 1. Use a fine-point, felt-tip pen to mark the forward, mid (recommended) and aft C.G. locations on the bottom of both sides of the wing 1/2" [13mm], 11/16" [17mm] and 7/8" [22mm] back from the leading edges where they meet the fuselage.

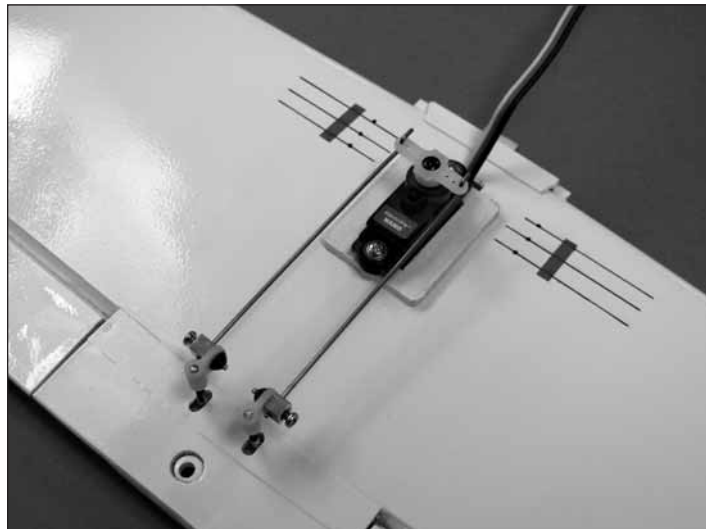


- 2. Cut the **C.G. Marking Guide** from the back of the manual. Use the guide to draw lines across the marks you made in the previous step.



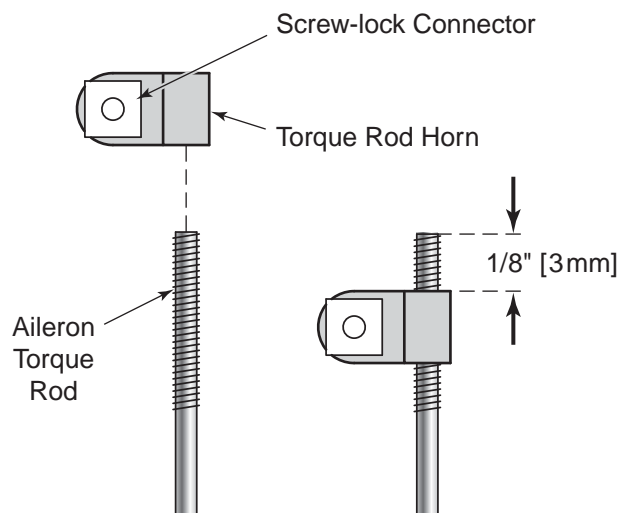
- 3. Lay strips of vinyl tape across the balance lines where indicated by the arrows on the guide. These tape strips, aligned with the sharpened supports on the balance stand, will keep the plane from slipping off the stand.

Hook Up the Ailerons

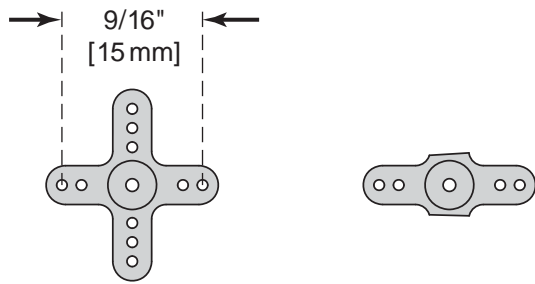


Refer to this photo while hooking up the ailerons.

- 1. Test fit the aileron servo in the plywood **servo mount** on the bottom of the wing. If necessary, carefully trim the mount to accommodate your servo, then mount the servo with the included servo screws (or the screws that came with your servo).
- 2. Temporarily remove the servo, harden the screw holes with a drop of thin CA, and allow to harden. Then, remount the servo.

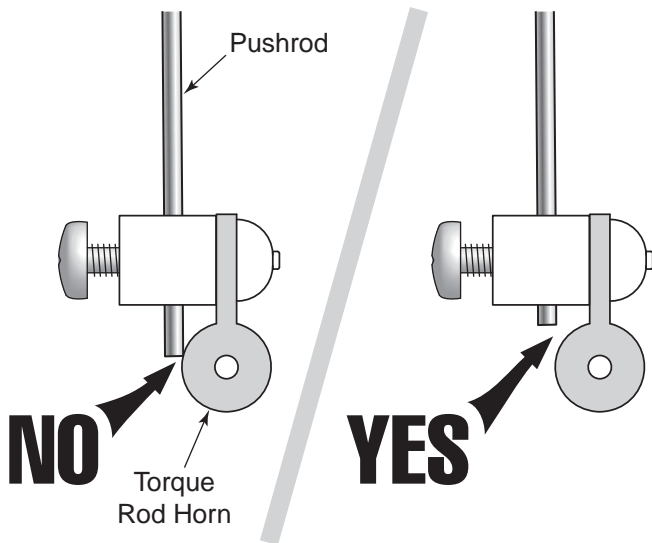


- 3. Mount a micro screw-lock connector to each **torque rod horn** with the retainers. Thread the horns onto the torque rods until the tops of the horns are 1/8" [3mm] down past the ends of the rods.



AILERON Servo Arm

- ❑ 4. Temporarily connect the aileron servo to the receiver and turn the system on to center the servo. Fit a servo arm to the servo that will have holes 9/16" [15mm] apart and cut off the unused arms.



Make sure the end of the pushrod *is not* contacting the side of the torque rod horn.

- ❑ 5. Connect the servo arm to the torque rods with the included pushrods. Center the ailerons and temporarily tighten the screws in the screw-lock connectors to lock the pushrods down. Make sure the ends of the pushrods do not contact the sides of the torque rod horns. If they do, shorten the pushrods as necessary.

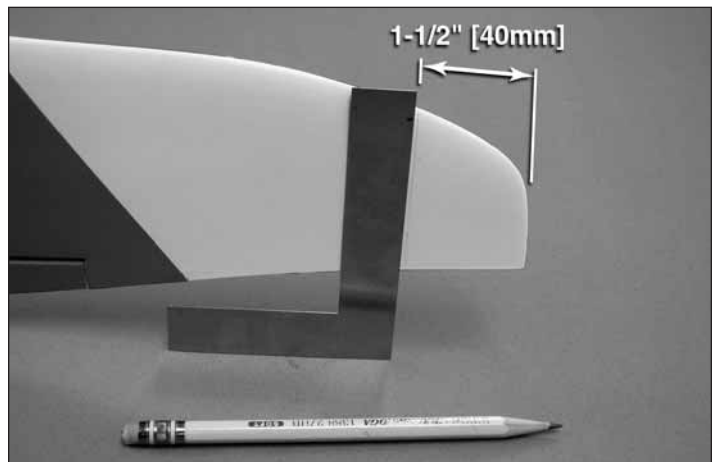
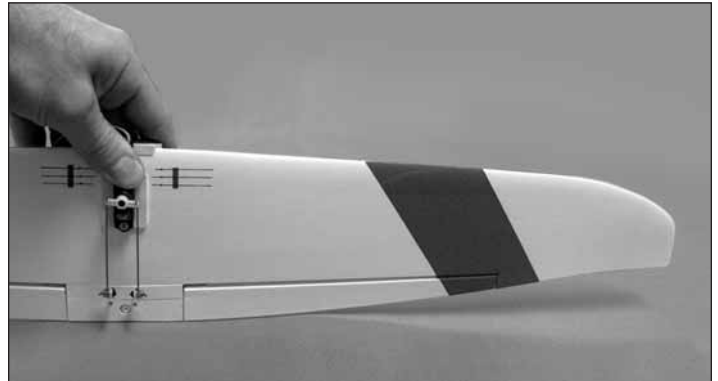
- ❑ 6. With the radio on and the ailerons centered, securely lock the pushrods down to the screw-lock connectors with the screws and a drop of threadlocker.

- ❑ 7. Make sure the servo arm screw is in place. Turn on your transmitter and lower the throttle stick. Install and connect the motor battery, then connect the aileron servo wire to the receiver. Mount the wing to the fuselage with the included 3mm x 10mm counter-sink flat-head Allen screw. Operate the ailerons to make sure the servo arm, pushrods and torque rods are not interfering with anything else down inside the fuselage (such as the elevator servo, receiver or wiring).

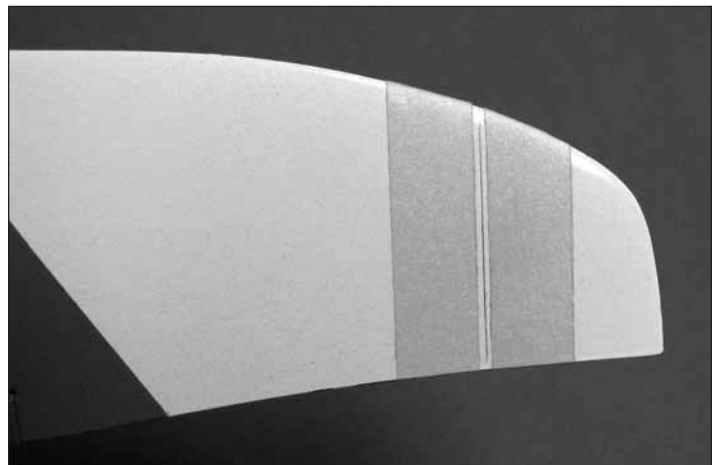
- ❑ 8. Since you're working on your ailerons and have them operating now, this would be a good time to set the aileron throw as noted on page 12 (or, you could wait to set the throws when you get to that part of the manual later).

Mount the Landing Skids

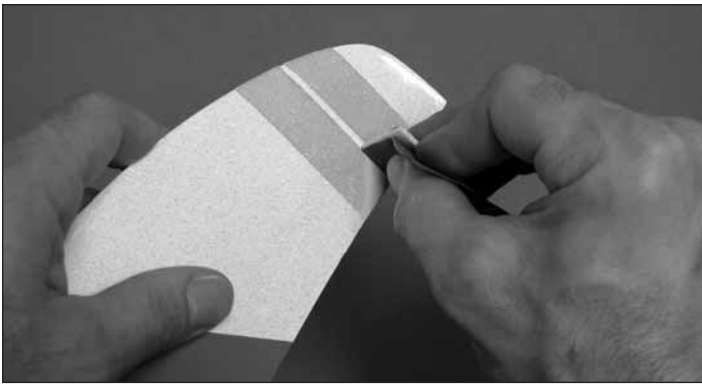
Don't fly your Rifle without the landing skids. In addition to protecting the underside, the landing skids perform the important function of causing the plane to maintain a straight-ahead trajectory on landing. Otherwise, it may spin and pirouette, causing one of the wing tips to dig into the ground and possibly cause damage.



- ❑ 1. Find an assistant to hold the wing as shown in the top photo, with the trailing edge against your workbench. Use a small builder's square and a pencil to mark vertical lines on the bottom of both wings 1-1/2" [40mm] from the tips.



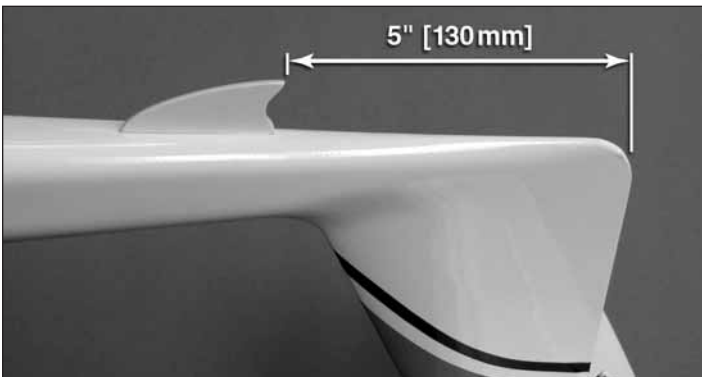
- ❑ 2. Apply strips of masking tape 1/16" [1.5mm] on both sides of both lines.



3. Use medium-grit sandpaper to roughen the exposed paint between the tape. **Hint:** Wrap your sandpaper around a 3/32" [2.4mm] sheet of balsa or something similar.



4. Remove the tape and clean off any residual tape glue. Note that base of the two **wing skids** is slightly curved to match the airfoil shape of the wing while the **fuselage skid** is flat. Glue the wing skids to the bottom of the wing as shown, starting with just a drop of thin CA. After the thin CA has hardened, follow with another drop or two of thin CA or medium CA. Allow to harden.



5. Prepare the bottom of the fuselage the same way and glue the fuselage skid to the bottom of the fuselage 5" [130mm] from the end, making certain it is centered.

Apply the Decals

The decals are applied "wet," with window cleaner. This allows for precise positioning and after you squeegee out the window cleaner from under the decal there will be no air bubbles (as there usually are when you apply them dry).

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

2. Be certain the model is clean and free from oily fingerprints and dust. Peel the first decal you wish to apply from its protective backing. Then, spray the back of the decal with window cleaner.

3. Position the decal where desired and adjust for perfection. Use a piece of soft balsa or something similar to squeegee the window cleaner from under the decal. Apply the rest of the decals the same way.

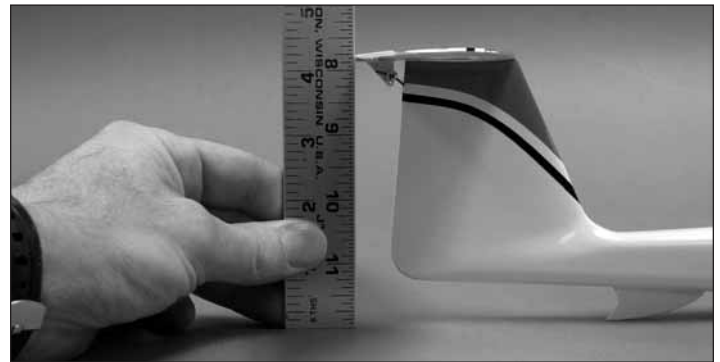
GET THE MODEL READY TO FLY

Set the Control Throws

To ensure a successful first flight, set up the Rifle according to the control throws specified. The throws have been determined through flight testing and record-keeping to give the pilot enough control to quickly change directions while at the same time not over controlling. If, after you have become accustomed to the way the Rifle 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."

Measure the **high rate** elevator throw first...

1. Turn on the transmitter, install and connect the motor battery, plug in the aileron servo, and mount the wing.



2. Holding a ruler vertically against the trailing edge of the middle of the elevator (the widest part), measure and

compare the up and down throw to the specified throw below. If necessary, adjust the elevator throw by changing the ATVs in your transmitter or by moving the pushrod on the servo arm. If you've connected the pushrod to the servo arm as specified in the instructions the throws should be pretty close.

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

NOTE: The throws are measured at the **widest part** of the elevator and ailerons.

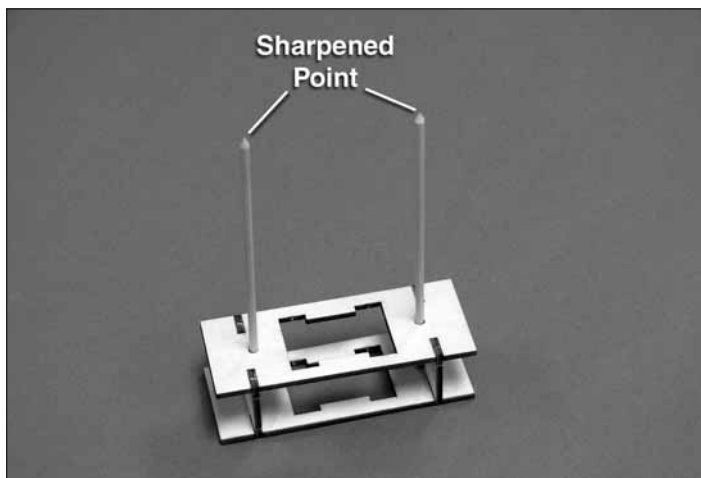
These are the recommended control surface throws:

	HIGH RATE		LOW RATE	
	Up	Down	Up	Down
ELEVATOR	3/16"	3/16"	3/32"	3/32"
	[5mm]	[5mm]	[2mm]	[2mm]
	13 deg	13 deg	7 deg	7 deg
AILERONS	3/16"	3/16"	1/8"	1/8"
	[5mm]	[5mm]	[3mm]	[3mm]
	11 deg	11 deg	7 deg	7 deg

3. Measure and set the low-rate elevator throw and the high and low-rate aileron throw.

Balance the Model (C.G.)

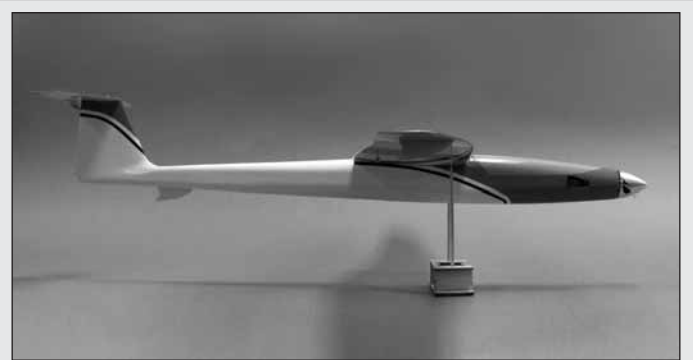
More than any other factor, the C.G. (center of gravity/ balance point) can have the greatest effect on how a model flies and could determine whether or not your first flight will be successful. If you value your model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.**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



1. Assemble and glue together the plywood **balance stand**, but before gluing in the **dowel uprights** sand the ends to a point.

2. At this stage your Rifle should be in ready-to-fly condition with **all** of the components in place including the complete radio system, motor, propeller and spinner. Install the motor battery and mount the wing.

3. Place your Rifle on the balance stand with the pointed ends of the uprights on the **middle** balance lines you marked earlier.



This is where the Rifle should balance for the first flights. Later, you may experiment by shifting the C.G. 3/16" [4.8mm] forward or 3/16" [4.8mm] back to change the flying characteristics. Moving the C.G. forward will improve stability, but the model will then land even faster. Moving the C.G. aft will allow for slightly slower landing speeds, but the model will then be more responsive. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



4. If the model sits level it is perfectly balanced and is nearly ready to fly. If it does not sit level ballast may be required. Try moving your Rifle forward or aft on the pointed uprights just to see where it actually does balance. If it balances within 1/16" [1.6mm] forward or aft of the middle line (noting the recommended balance point) you could probably fly your Rifle as balanced. But if it balances any farther than that you should go ahead and balance it at the recommended location. For certain, **DO NOT** fly the Rifle if it balances outside the **forward** or **aft** lines. If any ballast is required, it shouldn't take much more than approximately 1/4 oz. [7g] on the tail or 1/2 oz. [14] in the nose.

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.**

❑ 5. To find out how much weight will be required, lay segments of Great Planes "stick-on" lead (GPMQ4485) on the fuselage over the nose or tail where it will be attached. Nose weight can be added inside the top of the fuselage just behind the motor and tail weight can be stuck to the bottom of the stab right next to where it attaches to the fuselage. Once you have determined the amount of weight required, it can be permanently attached.

❑ 6. **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, lift the model by the spinner and one finger under the tail at the very end of the fuselage. Do this several times.

❑ 2. If one wing always drops, it means that side is heavy. Add stick-on weight to the bottom of the wing under the light 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 decal sheet and place it on or inside your model.

Charge the Battery

Follow the battery charging instructions that came with your radio control system to charge the transmitter 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.

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!*).

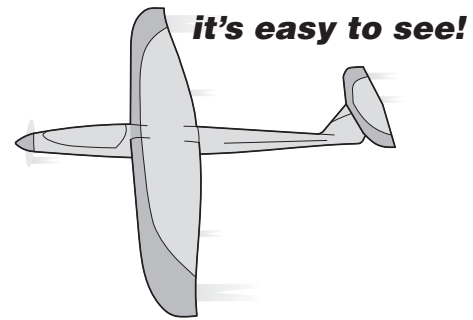
- 1. Make certain you've set the **C.G.** and the **control throws** according to the measurements provided in the manual.
- 2. Confirm that the elevator and ailerons operate in the correct direction.
- 3. Make sure the servo arms are secured with the screws that came with them.
- 4. Make sure the receiver antennas are oriented as specified by the manufacturer.
- 5. Use threadlocking compound on the screws that lock the pushrods down to the screw-lock connectors.
- 6. Examine the elevator and ailerons to make sure the built-in hinges are intact.
- 7. Make sure the servo screw holes have been hardened with thin CA.
- 8. Place your name, address, AMA number and telephone number on or inside your model.
- 9. Range check your radio when you get to the flying field.
- 10. Before each flight closely inspect the elevator and aileron pushrod linkages to make sure they are secure.

FLYING

1. Advanced flying skills are required to fly the Rifle. It should not be flown by beginner or intermediate pilots.
2. The Rifle will fly at speeds near 100 mph and should be flown only at an approved AMA flying site.
3. The Rifle can get out of sight quickly. Keep your focus on the plane at all times.

CAUTION: The Rifle flies smoothly and predictably, but it is small and flies EXTREMELY fast, so it is not a plane that should be flown by beginners or pilots with little experience. Further, the Rifle possesses no self-correcting tendencies whatsoever—it waits for your inputs before changing directions. **Therefore, the Rifle must be flown only by experienced pilots who are able to keenly detect what the model is doing and decisively provide the correct control inputs.**

When the Rifle is flying in front of you...



However,

there may be moments during the turnaround when...



this is all you see.

Even experienced pilots must not underestimate the Rifle's extreme speed. Of course, it's easy to lock onto the Rifle when it's shooting by right out in front of you, but it takes only a few seconds to get near the limits of your flight pattern when it will appear extremely small and you will be seeing it from a different perspective. This is when you can lose orientation or visual contact altogether, so you must see clearly and react decisively. For these reasons please follow these pieces of advice—**especially for your very first flights.**

1. Do not fly your Rifle on a cloudy or overcast day. Poor lighting and a gray background make it even more difficult to see. No matter what colors or markings your Rifle has, it will all disappear when it gets far away and just turns into a black dot with no orientation cues.
2. Do not fly when facing the sun. Wait for ideal light conditions when the sun is at your back.
3. **Do not try to fly your Rifle in confined flying sites.** While it is always possible (but not advisable) to fly above obstructions, the Rifle requires at least two or three times the approach and landing space of regular sport models.
4. Do not fly the Rifle if for some reason, any of your senses may have been compromised (from lack of sleep, hunger, dehydration, etc.). Your vision, concentration and reaction time must be optimum.
5. Never take your eyes off the model – even while adjusting the flight trims.

Mount the Wing

When ready to fly, turn on your transmitter and make sure the throttle stick is all the way down. Install and connect the battery, plug the aileron servo wire into the receiver and mount the wing.

Operate the controls to make sure everything is responding correctly and smoothly.

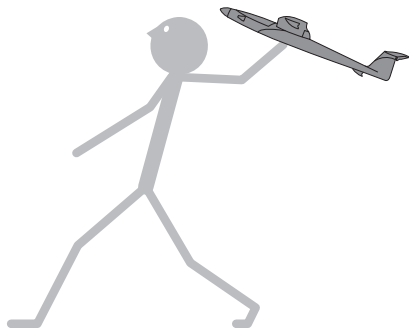
Ground Check and Range Check

Always perform an operational ground check 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 motor off and once with the motor 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, or poor receiver antenna routing.

Hand-Launch

First, it's a good idea to use a flight timer to alert you when it's time to land—it's always desirable to have reserve battery power because more than one landing attempt will probably be necessary—especially for the first flight. Throughout testing we set our timer to four minutes (of motor run time). This should provide an additional minute of run time for landing approaches. For your first flight it might even be a good idea to set your timer to three minutes until you know for certain how long your Rifle will fly.

The Rifle can be launched by the pilot, but for the first couple of flights, and until the model has been trimmed for straight-and-level flight, it is a good idea to have an assistant (with some prior hand-launching experience) launch the Rifle for you.



Hold the model by the bottom of the fuselage under the wing. As you should do before every flight, **double-check that the controls are responding properly and in the correct**

direction. Then, arm the motor and run it up for a second to make sure it is making full power and sounds good. Make sure your launch will be directly into any prevailing wind. Inform your assistant of your intentions, make certain he acknowledges, and then apply full throttle. Your assistant should run for a few steps, then throw the plane into the air at about a 30-degree angle, doing his best to level the wing with the horizon.

Expect the Rifle to descend briefly before it gains enough airspeed to establish a climb. Use the sticks to keep the wings level.

At this point you're in the clear and the model will climb as it rapidly continues to gain speed—this will all happen within two or three seconds!

Flying

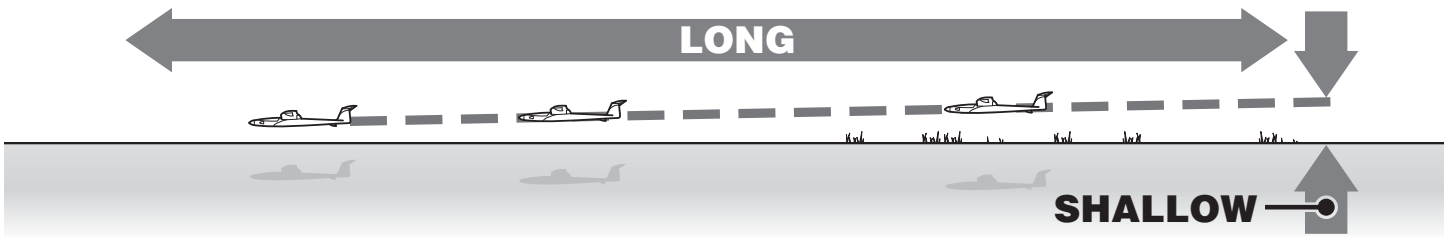
Your first priorities will be to get the Rifle trimmed so it flies straight-and-level when the sticks are neutral and to keep it under control so you can keep it within visual range. If you find yourself getting “behind” the Rifle, you can always throttle back to 1/2 or even slightly less throttle. This will slow the plane (a little) providing you with (slightly) more time to think and react. You can also have your assistant adjust the trims for you so you don't have to lift your fingers from the control sticks.

Once you have the Rifle trimmed you should be able to fly full throttle for extended periods, but it's prudent to throttle back (or cut the throttle altogether!) in turns so it doesn't get too far away. Fly “large”, keeping turns wide and smooth. One good turn-around maneuver is to climb vertically, half roll, throttle back, and then pull a 3/4 loop to upright level. Of course, you can always “crank and bank” it too!

While at a high altitude with plenty of battery power, simulate a landing approach by cutting the throttle and watching the Rifle glide. This will give you an indication of how it will land.

(Continued on page 16)

Once over the flying field the Rifle prefers a long, shallow descent.



Landing

The Rifle doesn't land like most other airplanes. It won't fly slowly enough to make a proper flair and you need to keep the speed up to maintain aileron control authority to keep the wings level.

When you're ready to land, throttle back early on the downwind leg and allow the Rifle to bleed off some of its airspeed. Before the Rifle makes its crosswind turn cut the throttle completely and allow it to continue its descent toward the landing zone. It will still be considerably far out and you'll be looking at it almost head-on.

When the Rifle is a foot or two [.3 - .6m] off the ground allow it to continue a shallow descent with the first priority to keep the wings level. Continue to hold elevator until it eventually catches the ground and skids to a stop—it usually doesn't skid very far—just a few yards [meters] or so.

If, at any point during your landing setup you realize you are coming in too fast, simply throttle up, go around and try again. And if you're coming in too short, apply throttle to stretch the landing.

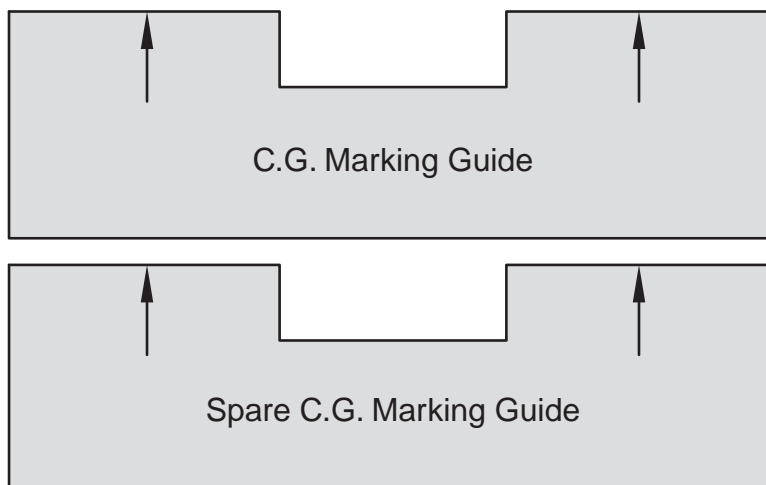
After every landing closely inspect the model looking for any damage. Replace the propeller if necessary.

After a few flights you'll have your Rifle all trimmed out for level flight and be executing perfect hand-launches, adrenaline-pumping flights and smooth, routine landings right at your feet.

One final note about flying your Rifle. 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