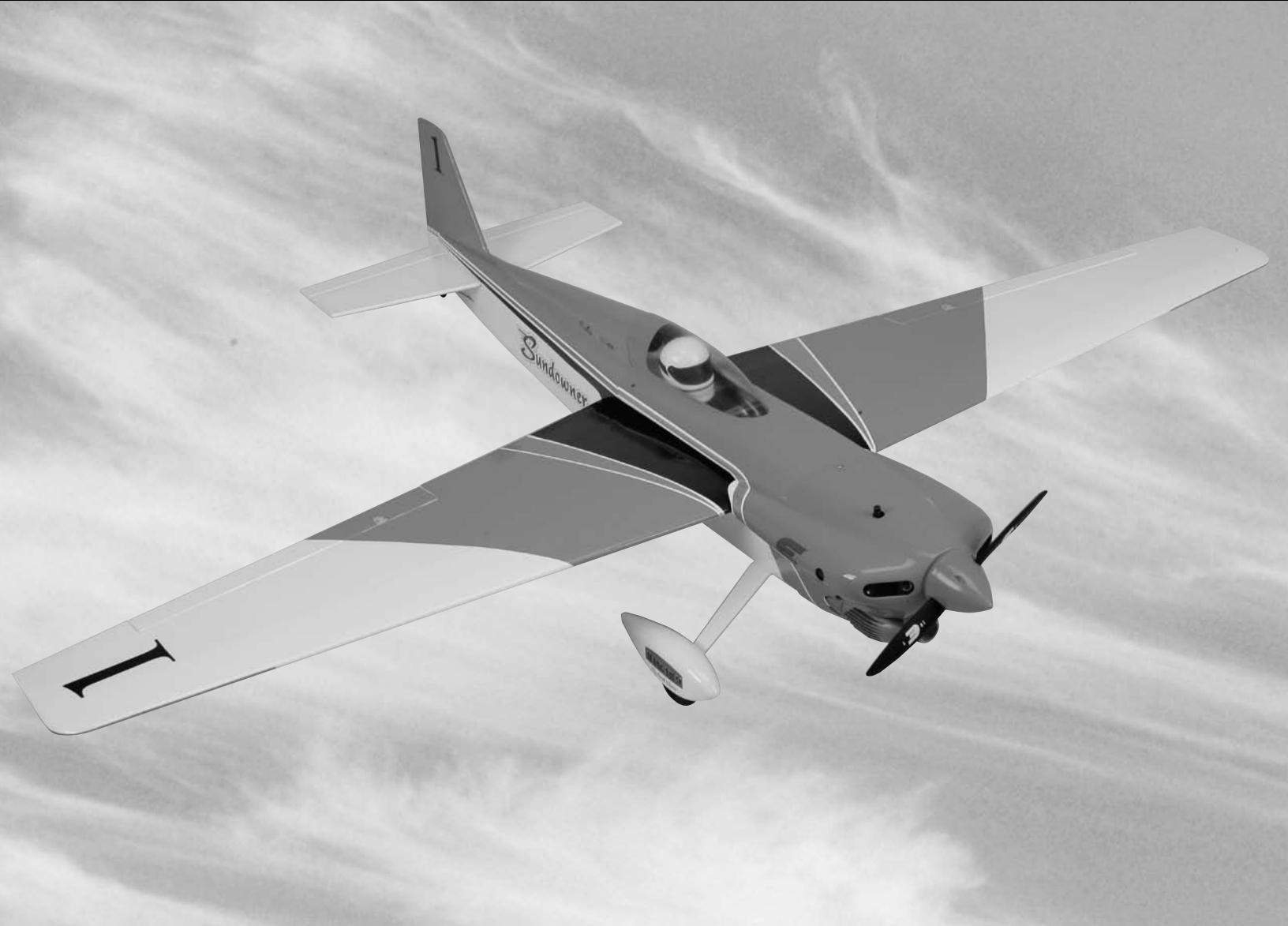




*Fly First Class™*

# **Sundowner 50 ARF**

## **ASSEMBLY MANUAL**



### Specifications

Wingspan.....63 in (1600mm)  
 Wing area.....572 sq in (36.9 sq dm)  
 Length.....47.4 in (1204mm)  
 Weight..... 6–6.75 lb (2.72–3 kg)

Engine..... .56–.82 Four-Stroke  
 ..... .40–.52 Two-Stroke  
 .....Power 46 Electric  
 Radio.....4-Channel w/5 Servos (4 for electric)

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# Using the Manual

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This manual is divided into sections to help make assembly easier to understand, and to provide breaks between each major section. In addition, check boxes have been placed next to each step to keep track of each step completed. Steps with a single box (☐) are performed once, while steps with two boxes (☐ ☐) indicate that the step will require repeating, such as for a right or left wing panel, two servos, etc. Remember to take your time and follow the directions.

## Required Tools and Adhesives

---

### Tools

- Felt-tipped pen or pencil
- Adjustable wrench
- Hobby knife
- Phillips screwdriver (large)
- Ruler
- Soldering iron
- Hex wrench: 3/32-inch
- Drill bit: 1/16-inch (1.5mm), 5/64-inch (2mm), 9/64-inch (3.5mm)
- Flat screwdriver
- Drill
- Masking tape
- Phillips screwdriver (small)
- Sandpaper
- Solder

### Adhesives

- Formula 560 Canopy Glue (PAAPT56)
- Thin CA (cyanoacrylate) Glue (PAAPT07)
- Pacer Z-42 Threadlock (PAAPT42)
- CA Remover/Debonder (PAAPT16)

## UltraCote Covering Colors

---

- |                  |         |          |         |
|------------------|---------|----------|---------|
| • Pearl Charcoal | HANU846 | • White  | HANU870 |
| • Silver         | HANU881 | • Orange | HANU877 |

## Before Starting Assembly

---

Before beginning the assembly of the Sundowner 50™, remove each part from its bag for inspection. Closely inspect the fuselage, wing panels, rudder, and stabilizer for damage. If you find any damaged or missing parts, contact the place of purchase.

If you find any wrinkles in the covering, use a heat gun or sealing iron to remove them. Use caution while working around areas where the colors overlap to prevent separating the colors.



**HAN101 – Sealing Iron**

**HAN141 – Sealing Iron  
Sock**



**HAN100 – Heat Gun**

**HAN150 – Covering Glove**

# Radio and Power Systems Requirements

---

- 4-channel radio system (minimum) w/receiver
- JR Standard Switch (JSP98010)
- Y-harness (Ailerons) (JSP98020) (Required when using 4-channel radio) or 6-inch Servo Lead Extension (JSP98110); (2) when mixing ailerons through the radio
- DS821 Digital Sport Servo (JRPS821) (5) or equivalent (4 when building electric version)
- Large Servo Arms (JSP98060)
- 700mAh Ni-Cd 4-cell (JSP91010)

## Recommended JR, JR SPORT and Spektrum Systems

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- XP9303
- XP7202
- DX7
- XP6102
- XS600



JR XP9303



Spektrum DX7



JR XP7202

## Recommended Setup—Glow

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- Evolution® .52NX with Muffler (EVOE0520)
- Evolution Propeller 11 x 5 (EVO11050) to 11 x 6 (EVO11060)
- Saito™ .82 AAC w/Muffler (SAIE082A or SAIE082AGK)
- Propeller 13 x 8 (EVO13080) or 14 x 6 (EVO14060)



Evolution .52NX  
EVOE0520

## Recommended Setup—Electric

---

- E-flite® Power 46 BL Outrunner Motor (EFLM4046A)
- Castle Creations 60A ESC (CSEPHX60)
- Thunder Power 4S 3850–4500mAh Li-Po Battery Pack
- APC Propeller 13x6.5-inch (APC13065E) to 14x7 (APC14070E)



Power 46 Brushless  
Outrunner Motor, 670Kv  
EFLM4046A

## FS One

---

With FS One® you get more than photorealistic fields, gorgeous skies and realistic-looking aircraft. You get incredibly advanced aerodynamic modeling that simulates every possible aspect of real-world flight.



HANS2000

## Field Equipment

---

- Propeller
- Glow Plug Wrench (HAN2510)
- Glow Plug (EVOGP1)
- Fuel
- Extra Long Glow Plug Igniter w/Charger (HAN7115)
- Manual Fuel Pump (HAN118)

Spektrum is used with permission of  
Bachmann Industries, Inc.

# Warranty Period

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Exclusive Warranty- Horizon Hobby, Inc., (Horizon) warrants that the Products purchased (the "Product") will be free from defects in materials and workmanship at the date of purchase by the Purchaser.

# Limited Warranty

---

(a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for warranty claims. Further, Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(b) Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

(c) Purchaser Remedy- Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any goods by Purchaser must be approved in writing by Horizon before shipment.

# Damage Limits

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HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase.

Law: These Terms are governed by Illinois law (without regard to conflict of law principals).

# Safety Precautions

---

This is a sophisticated hobby Product and not a toy. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the Product or other property. This Product is not intended for use by children without direct adult supervision. The Product manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or injury.

# Questions, Assistance, and Repairs

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Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to [productsupport@horizonhobby.com](mailto:productsupport@horizonhobby.com), or call 877.504.0233 toll free to speak to a service technician.

## Inspection or Repairs

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If this Product needs to be inspected or repaired, please call for a Return Merchandise Authorization (RMA). Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as **Horizon is not responsible for merchandise until it arrives and is accepted at our facility**. A Service Repair Request is available at [www.horizonhobby.com](http://www.horizonhobby.com) on the "Support" tab. If you do not have internet access, please include a letter with your complete name, street address, email address and phone number where you can be reached during business days, your RMA number, a list of the included items, method of payment for any non-warranty expenses and a brief summary of the problem. Your original sales receipt must also be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

## Warranty Inspection and Repairs

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**To receive warranty service, you must include your original sales receipt** verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon Hobby.

## Non-Warranty Repairs

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**Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost.** By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. **Please note: non-warranty repair is only available on electronics and model engines.**

Electronics and engines requiring inspection or repair should be shipped to the following address:

Horizon Service Center  
4105 Fieldstone Road  
Champaign, Illinois 61822

All other Products requiring warranty inspection or repair should be shipped to the following address:

Horizon Product Support  
4105 Fieldstone Road  
Champaign, Illinois 61822

**Please call 877-504-0233 with any questions or concerns regarding this product or warranty.**

# Safety, Precautions, and Warnings

---

This model is controlled by a radio signal that is subject to interference from many sources outside your control. This interference can cause momentary loss of control so it is advisable to always keep a safe distance in all directions around your model, as this margin will help to avoid collisions or injury.

- Always operate your model in an open area away from cars, traffic, or people.
- Avoid operating your model in the street where injury or damage can occur.
- Never operate the model into the street or populated areas for any reason.
- Never operate your model with low transmitter batteries.
- Carefully follow the directions and warnings for this and any optional support equipment (chargers, rechargeable battery packs, etc.) that you use.
- Keep all chemicals, small parts and anything electrical out of the reach of children.
- Moisture causes damage to electronics. Avoid water exposure to all equipment not specifically designed and protected for this purpose.

## Contents of Kit

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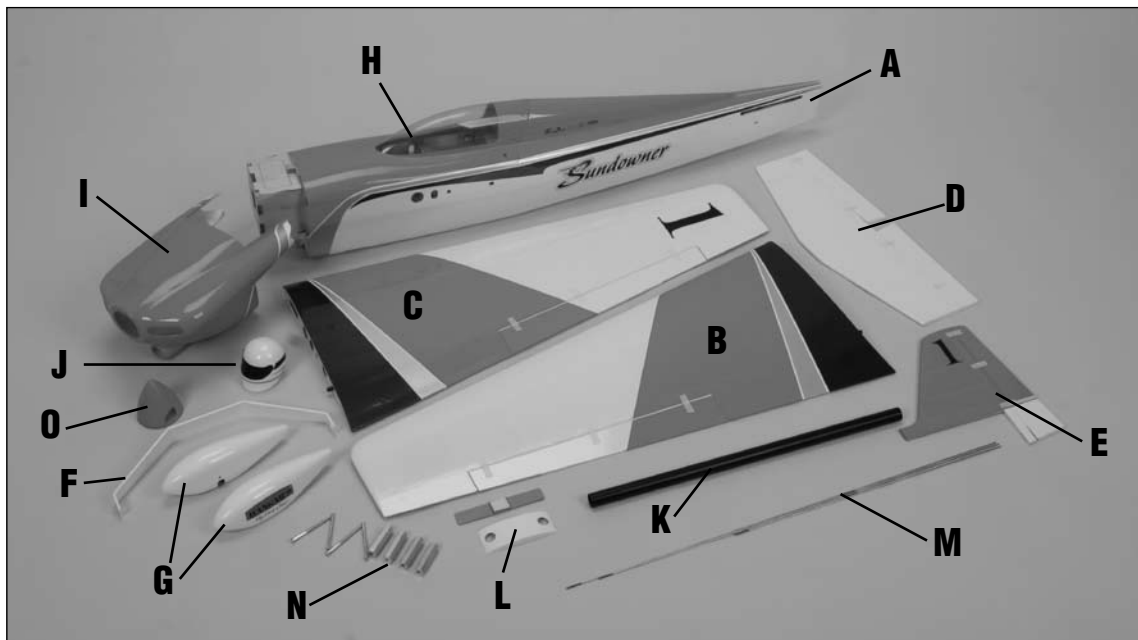
### Replacement Parts

A. HAN4726	Fuselage w/Canopy
B. HAN4727	Left Wing w/Aileron
C. HAN4728	Right Wing w/Aileron
D. HAN4729	Stabilizer and Elevator
E. HAN4730	Fin and Rudder
F. HAN4731	Landing Gear w/o Wheels
G. HAN4732	Wheel Pants
H. HAN4733	Canopy w/Framing
I. HAN4734	Fiberglass Cowl
J. HAN373	Pilot Head

K. HAN4737	Anodized Wing Tube
L. HAN4738	Landing gear cover
M. HAN4741	Pushrod Set
N. HAN4743	Electric Motor Standoffs 48mm
O. HAN4744	2 1/2-inch Spinner (Orange)

### Items not Shown

HAN4740	Decal Sheet
HAN1985	Engine Mount
HAN4163	Tail Wheel Assembly
HAN2479	Fuel Tank, 11 oz



# Section 1: Aileron Servo Installation

## Required Parts

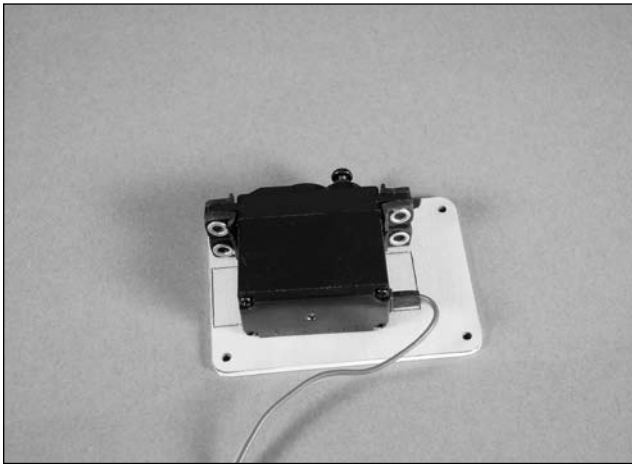
- Servo cover (right and left)
- Snap link (2)
- Nylon clevis (2)
- Clevis retainer (2)
- #2 x 3/8-inch sheet metal screw (8)
- 3 1/8-inch (80mm) threaded pushrod (2)
- Servo mounting blocks,  
3/4 x 9/16 x 5/16-inch (19 x 14 x 8mm) (4)

## Required Tools and Adhesives

- Felt-tipped pen
- Thin CA
- Phillips screwdriver
- Long servo arm (2)
- String
- Weight or wheel collar
- Drill bit: 5/64-inch (2mm)
- Pliers
- Side cutters
- Drill
- Pin drill
- Sandpaper

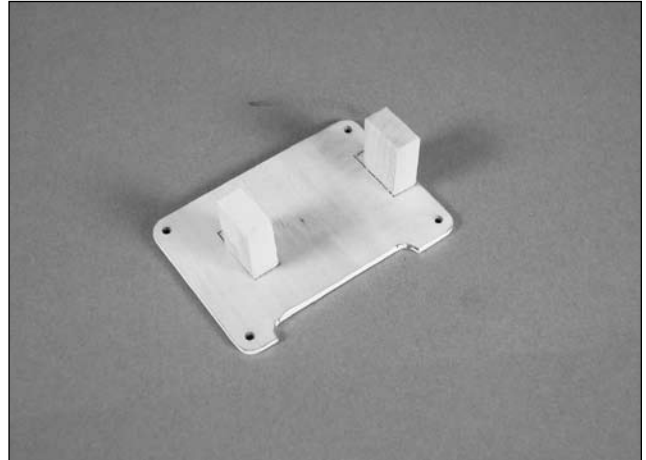
### □□ Step 1

Position the servo between the laser-etched marks on the servo cover. If the servo does not align between the marks, align the servo with the marks closest to the edge and relocate the marking for the remaining block.



### □□ Step 2

Use sandpaper to roughen the surface of the 3/4 x 9/16 x 5/16-inch (19 x 14 x 8mm) hardwood blocks that will be attached to the servo cover. Use 30-minute epoxy to attach the blocks to the servo covers.



### □□ Step 3

Use a felt-tipped pen to mark the locations for the servo mounting screws on the hardwood blocks. Leave a slight gap between the servo and servo cover to isolate it from vibrations transferred through the airframe and into the cover.

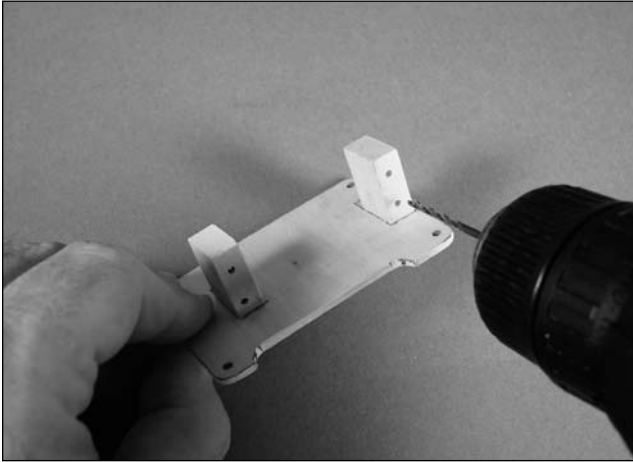




## Section 1: Aileron Servo Installation

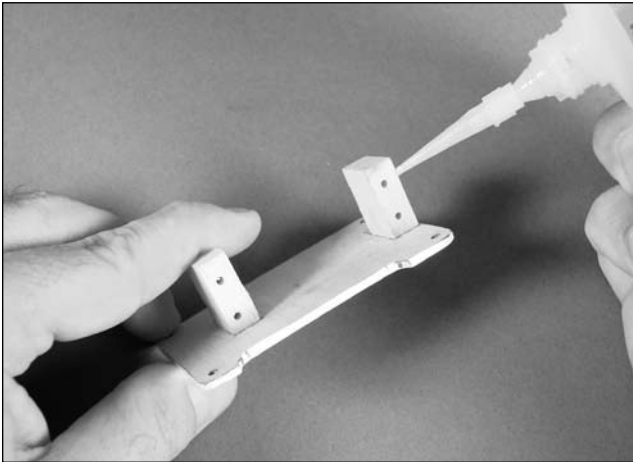
### □□ Step 4

Use a drill and 5/64-inch (2mm) drill bit to drill the holes for the servo mounting screws.



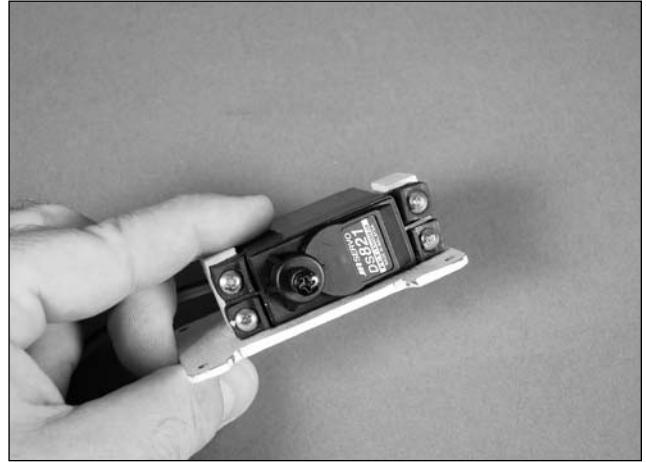
### □□ Step 5

Use 2–3 drops of thin CA into each hole to harden the surrounding wood.



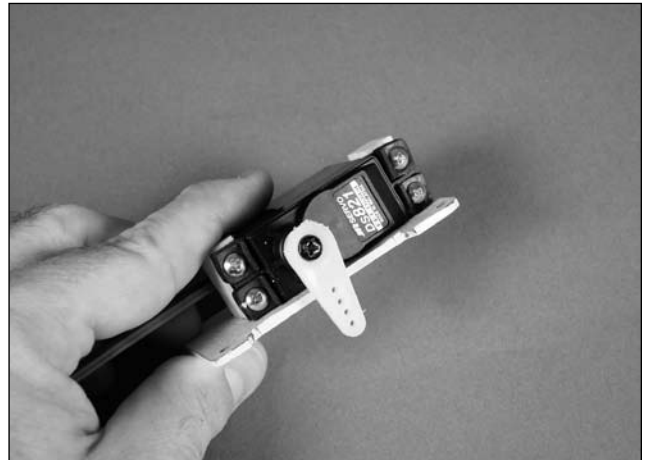
### □□ Step 6

Attach the aileron servo to the mounting blocks using the screws provided with the servo.



### □□ Step 7

Attach a long servo horn to the aileron servo after centering the servo with the radio system. Remove any unused arms from the servo horn as shown.



## Section 1: Aileron Servo Installation

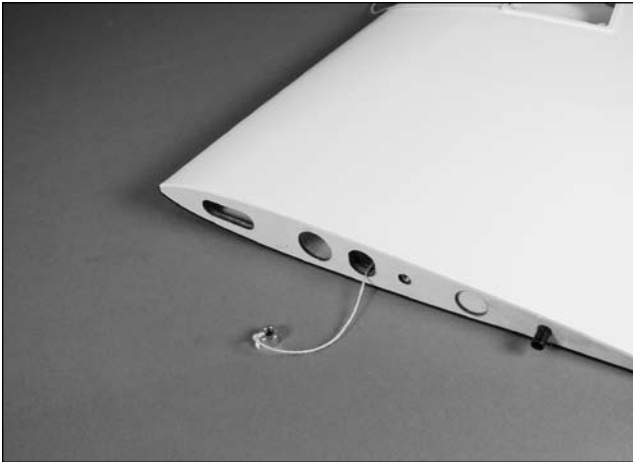
### □□ Step 8

Tie a weight or wheel collar to a piece of string. Lower the collar into the opening for the aileron servo as shown.



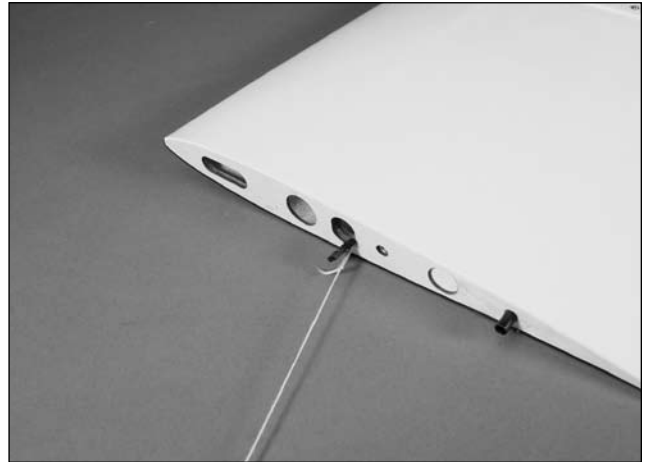
### □□ Step 9

Work the wheel collar through the wing until the collar exits the wing as shown.



### □□ Step 10

Tie the end of the string to the aileron servo lead and pull the lead through the wing.



### □□ Step 11

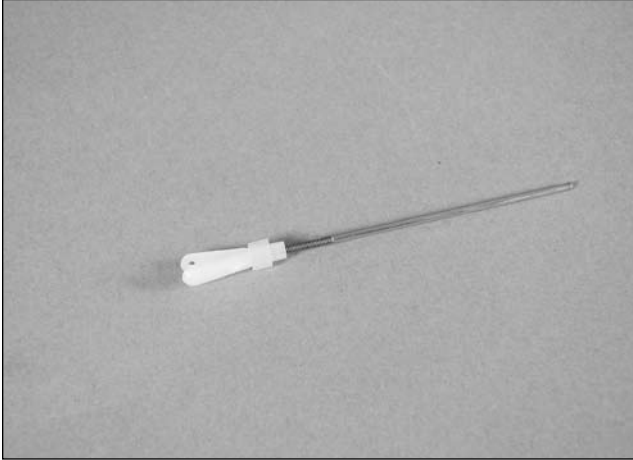
Secure the aileron servo cover to the wing using four #2 x 3/8-inch sheet metal screws.



## Section 1: Aileron Servo Installation

### □□ Step 12

Slide a clevis retainer onto one of the nylon clevises. Thread the clevis onto the  $3\frac{1}{8}$ -inch (80mm) threaded pushrod. Turn the clevis 14 turns so it is secure on the pushrod but can still be adjusted.



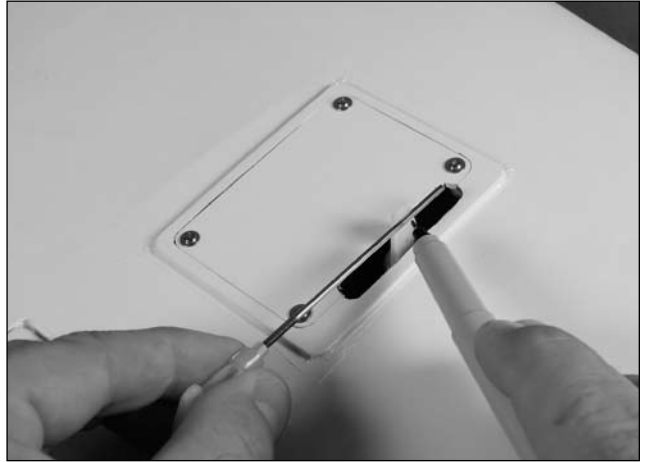
### □□ Step 13

Attach the clevis to the aileron control horn.



### □□ Step 14

Use a felt-tipped pen to mark the pushrod where it crosses the outer hole on the servo horn.



### □□ Step 15

Use a pair of pliers to make a 90-degree bend in the pushrod at the mark made in the previous step.



## Section 1: Aileron Servo Installation

### □□ Step 16

Use a pin drill and a 5/64-inch (2mm) drill bit to enlarge the outer hole in the servo arm.



### □□ Step 17

Slide the pushrod wire through the hole in the servo horn.



### □□ Step 18

Slide the snap link onto the pushrod wire, then rotate it until it snaps on the wire.



### □□ Step 19

Use side cutters to remove the excess wire. Leave at least 1/16-inch (1.5mm) exposed beyond the connector to prevent the wire from coming out of the connector.



### □ Step 20

Repeat Steps 1 through 19 to install the remaining aileron servo.

# Section 2: Engine Installation: 2-Stroke

## Required Parts

- Fuselage assembly
- #8 washer (8)
- 8-32 locknut (4)
- Clevis
- Clevis retainer
- Fuel tank
- 15<sup>7</sup>/<sub>8</sub>-inch (403mm) threaded pushrod
- 8-32 x 3/4-inch machine screw (4)
- 8-32 x 1-inch machine screw (4)

## Required Tools and Adhesives

- Hex wrench: 3/32-inch
- Ruler
- Threadlock
- Phillips screwdriver
- Felt-tipped pen
- Adjustable wrench
- Pin drill
- Drill
- Side cutters
- Fuel dot
- Drill bit: 5/64-inch (2mm), 5/32-inch (4mm), 11/64-inch (4.5mm)

### □ Step 1

Use a 3/32-inch hex wrench to loosen the two 4-40 screws and remove the canopy from the airframe.



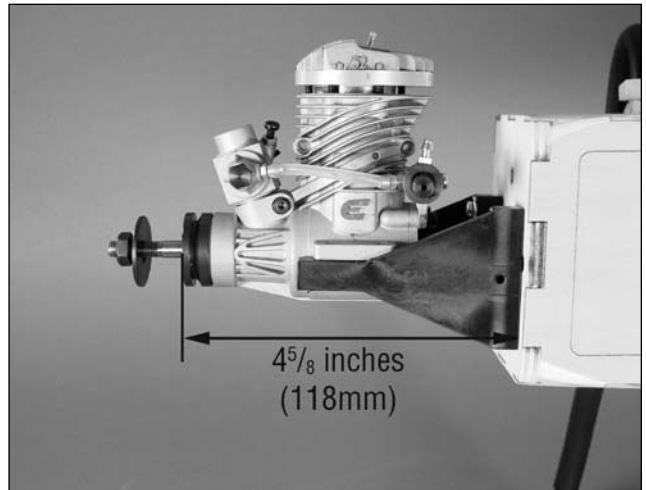
### □ Step 2

Attach the engine mount to the fuselage using four 8-32 x 3/4-inch machine screws and four #8 washers. Make sure to use threadlock on the screws to help prevent them from vibrating loose.



### □ Step 3

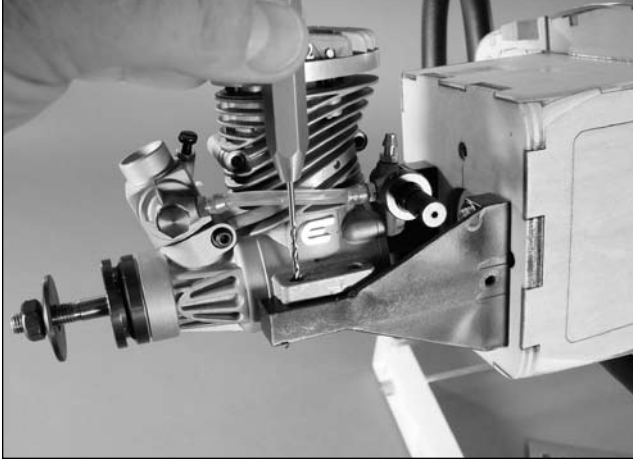
Position the engine with the drive washer 4<sup>5</sup>/<sub>8</sub> inches (118mm) forward of the firewall as shown.



## Section 2: Engine Installation: 2-Stroke

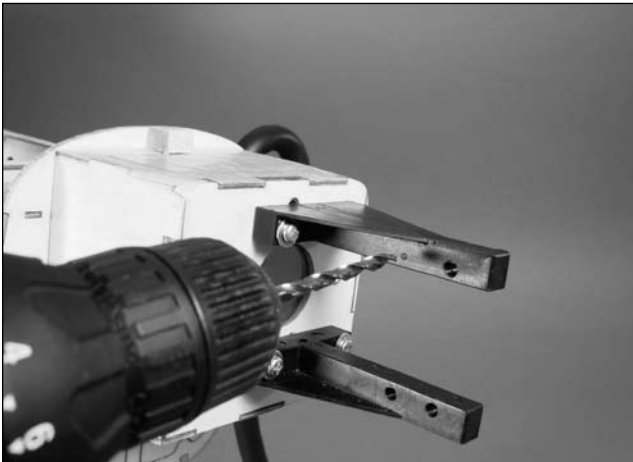
### □ Step 4

Use a pin drill and 5/64-inch (2mm) drill bit to drill a small indentation in the mount for the engine mounting screws.



### □ Step 5

Use a drill with an 11/64-inch (4.5mm) drill bit to drill the four holes in the engine mount rails.



### □ Step 6

Attach the engine to the mount using four 8-32 x 1-inch machine screws, four #8 washers and four locknuts. The washers are placed between the screw heads and the engine.



### □ Step 7

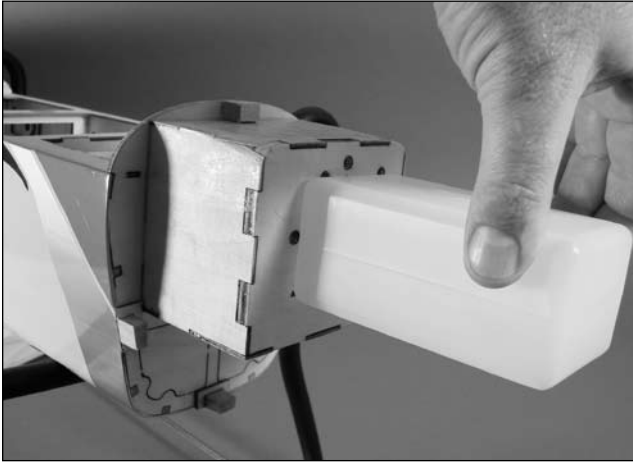
Use a felt-tipped pen to mark the firewall for the throttle pushrod.



## Section 2: Engine Installation: 2-Stroke

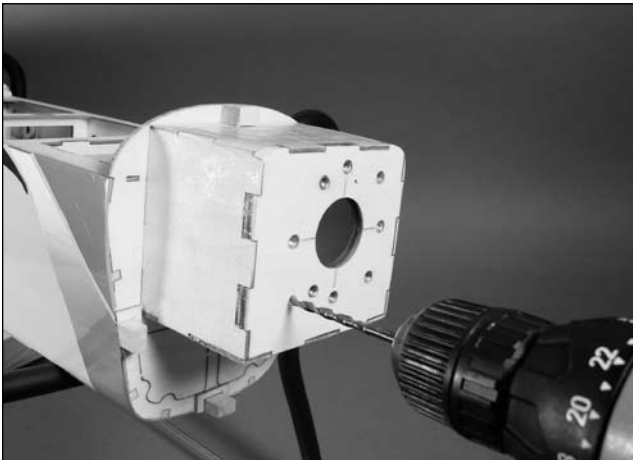
### □ Step 8

Place the fuel tank on the firewall from the outside to make sure the mark made in the previous step is outside the perimeter of the fuel tank. If it is inside the perimeter, relocate the mark so the pushrod does not interfere with the fuel tank.



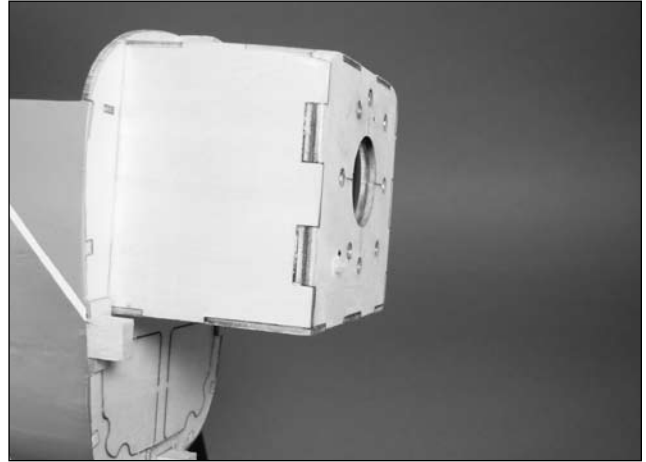
### □ Step 9

Use a drill and 5/32-inch (4mm) drill bit to drill a hole in the firewall for the throttle pushrod tube.



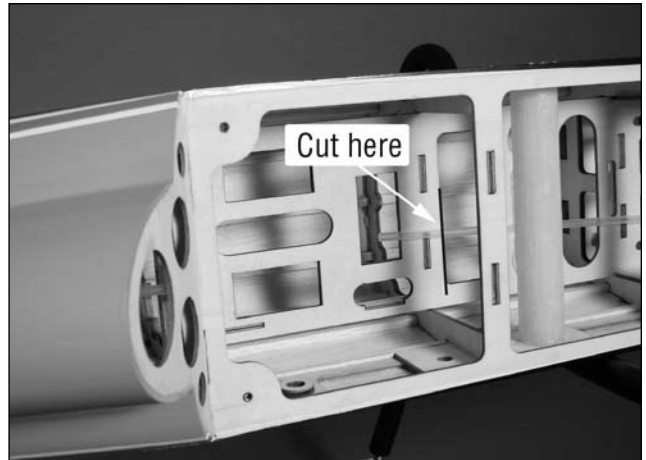
### □ Step 10

Roughen the pushrod tube using sandpaper. Slide the tube into the hole drilled in the previous step. Use medium CA to glue the pushrod to the firewall. Leave about 1/16-inch (1.5mm) protruding beyond the front of the firewall.



### □ Step 11

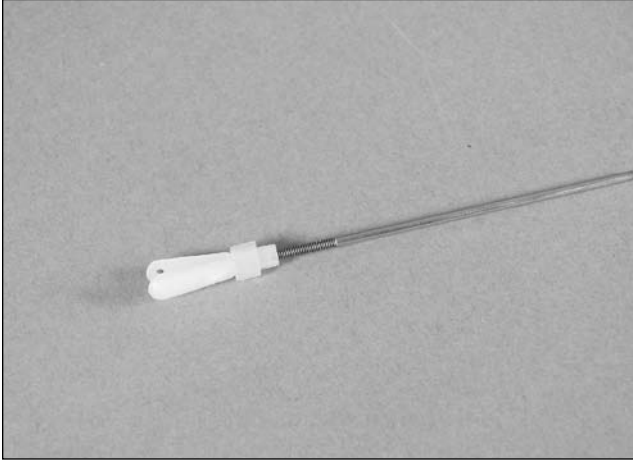
Use side cutters to trim the throttle pushrod at the location shown in the photo below.



## Section 2: Engine Installation: 2-Stroke

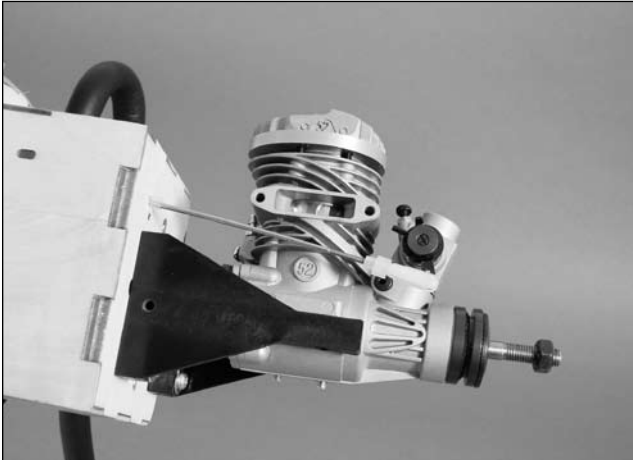
### □ Step 12

Slide a clevis retainer onto one of the nylon clevises. Thread the clevis onto the  $15\frac{7}{8}$ -inch (403mm) threaded pushrod. Turn the clevis 14 turns so it is secure on the pushrod but can still be adjusted.



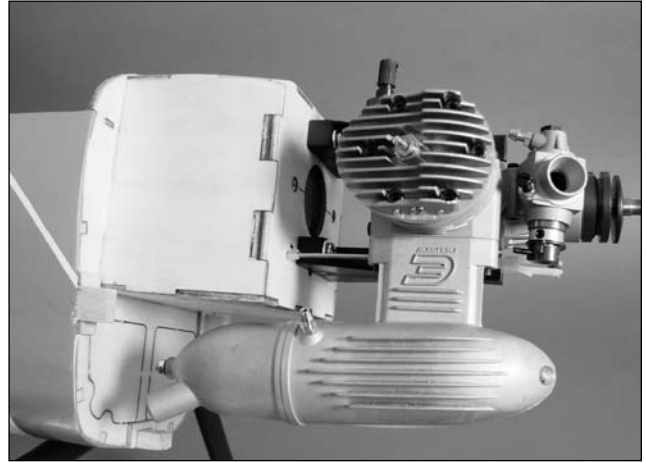
### □ Step 13

Attach the clevis to the carburetor arm on the engine.



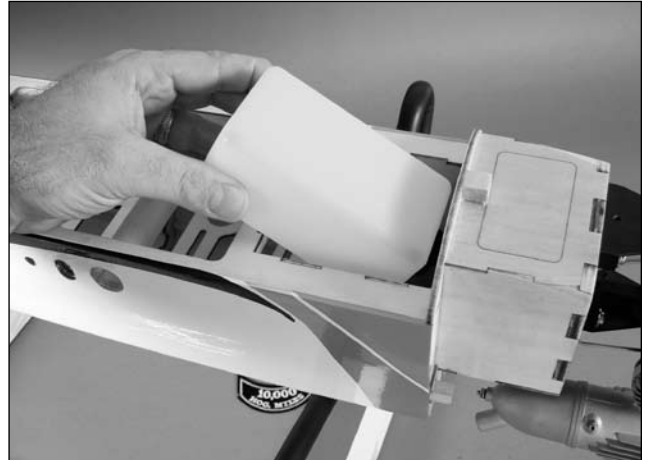
### □ Step 14

Follow the instructions provided with your engine to attach the muffler.



### □ Step 15

Slide the fuel tank into the fuselage. Make sure to locate the vent line from the fuel tank toward the top of the fuselage.





## Section 2: Engine Installation: 2-Stroke

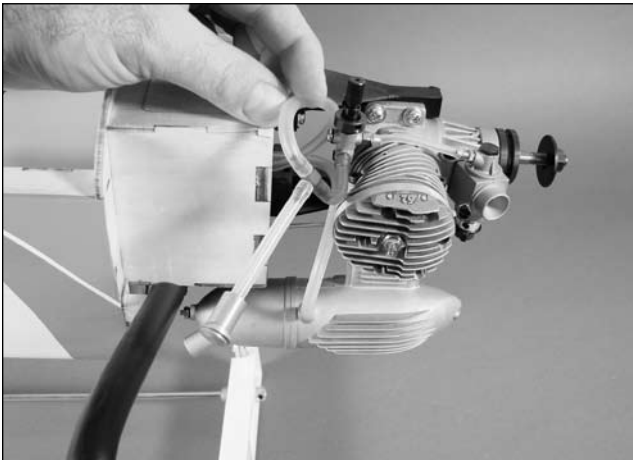
### □ Step 16

Secure the fuel tank inside the fuselage. Make sure to place foam at any points where the fuel tank contacts the airframe to help prevent vibrations from transferring to the fuel tank.



### □ Step 17

Connect the lines from the fuel tank to the engine and muffler. We used a fuel dot to allow fueling the tank from outside the cowling.



**Note:** The throttle must be closed all the way when fueling with this type setup to avoid flooding the engine. We clamp the fuel line to the carburetor using forceps.

# Section 3: Engine Installation: 4-Stroke

## Required Parts

- Fuselage assembly
- #8 washer (8)
- 8-32 locknut (4)
- Clevis
- Clevis retainer
- Fuel tank
- 15<sup>7</sup>/<sub>8</sub>-inch (403mm) threaded pushrod
- 8-32 x 3/4-inch machine screw (4)
- 8-32 x 1-inch machine screw (4)

## Required Tools and Adhesives

- Hex wrench: 3/32-inch
- Ruler
- Threadlock
- Phillips screwdriver
- Felt-tipped pen
- Adjustable wrench
- Pin drill
- Drill
- Side cutters
- Fuel dot
- Drill bit: 5/64-inch (2mm), 5/32-inch (4mm), 11/64-inch (4.5mm)

### □ Step 1

Use a 3/32-inch hex wrench to loosen the two 4-40 screws and remove the canopy from the airframe.



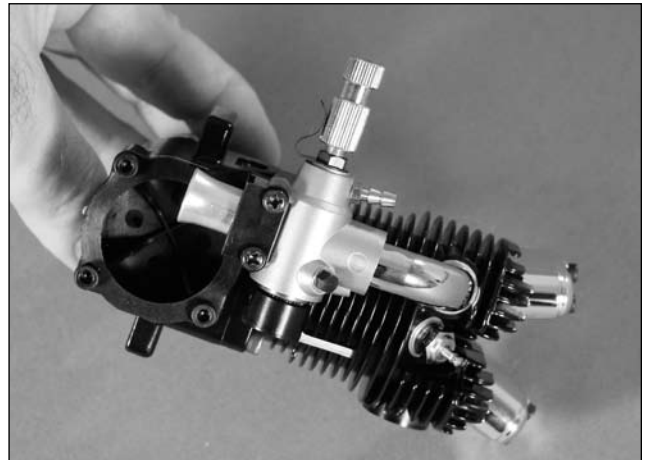
### □ Step 2

Attach the engine mount to the fuselage using four 8-32 x 3/4-inch machine screws and four #8 washers. Make sure to use threadlock on the screws to help prevent them from vibrating loose.



### □ Step 3

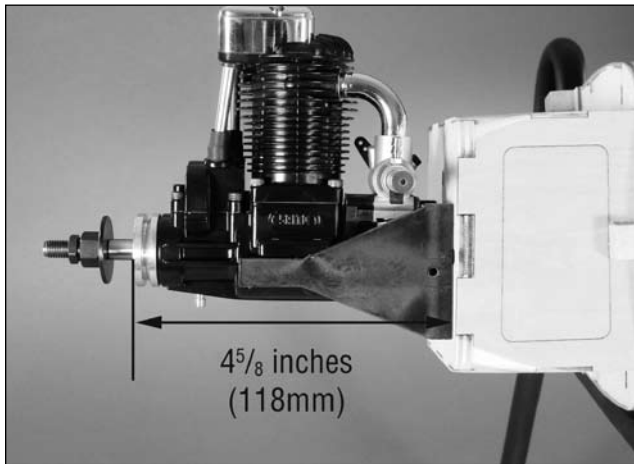
It may be necessary to rotate the carburetor on your engine. Use the photo below to determine if you need to remove and rotate the carburetor for your Sundowner 50.



### Section 3: Engine Installation: 4-Stroke

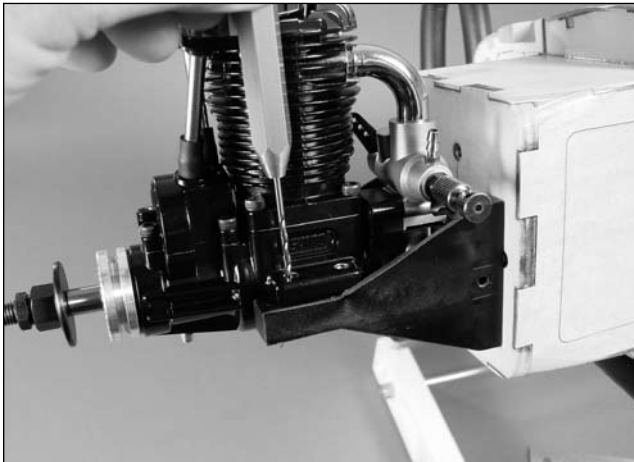
#### □ Step 4

Position the engine with the drive washer  $4\frac{5}{8}$  inches (118mm) forward of the firewall as shown.



#### □ Step 5

Use a pin drill and 5/64-inch (2mm) drill bit to drill a small indentation in the mount for the engine mounting screws.



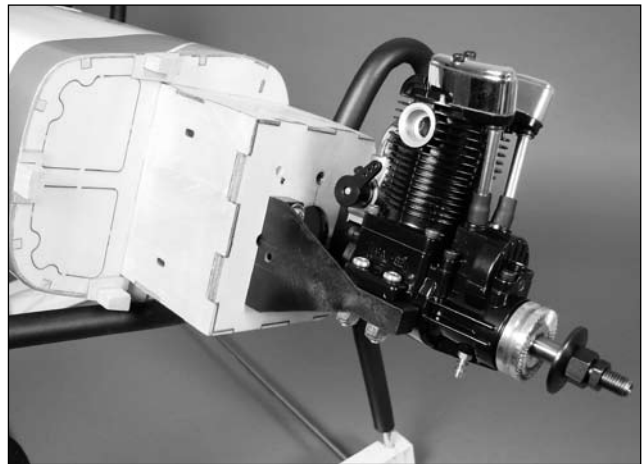
#### □ Step 6

Use a drill with an 11/64-inch (4.5mm) drill bit to drill the four holes in the engine mount rails.



#### □ Step 7

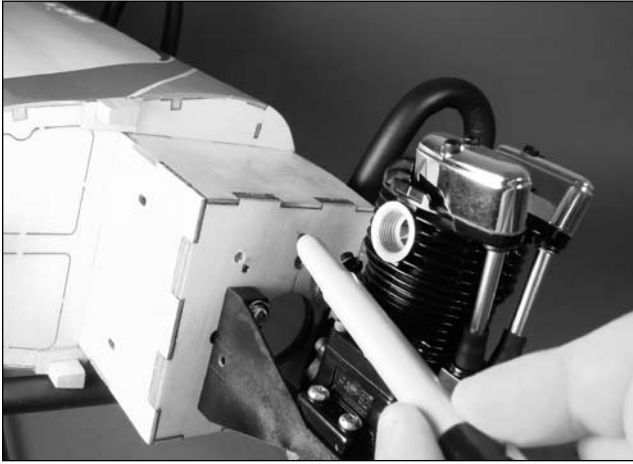
Attach the engine to the mount using four 8-32 x 1-inch machine screws, four #8 washers and four locknuts. The washers are placed between the locknuts and the engine mounting rails.



## Section 3: Engine Installation: 4-Stroke

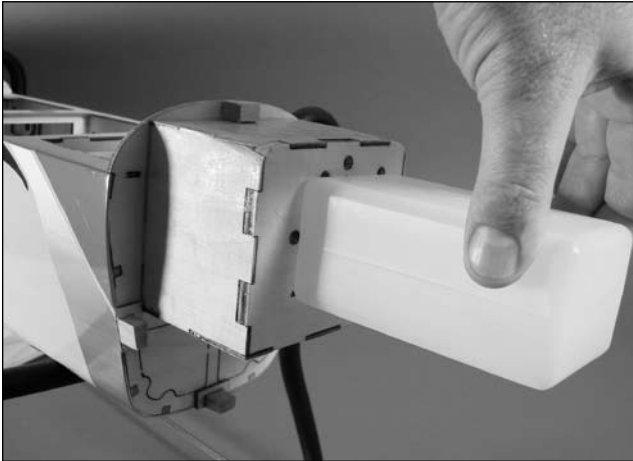
### □ Step 8

Use a felt-tipped pen to mark the firewall for the throttle pushrod.



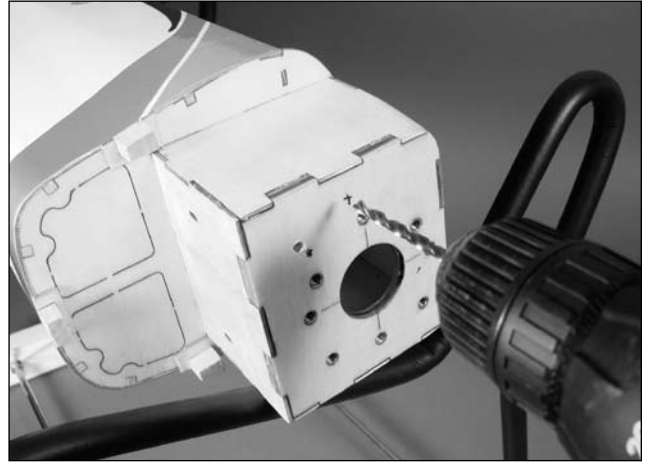
### □ Step 9

Place the fuel tank on the firewall from the outside to make sure the mark made in the previous step is outside the perimeter of the fuel tank. If it is inside the perimeter, relocate the mark so the pushrod does not interfere with the fuel tank.



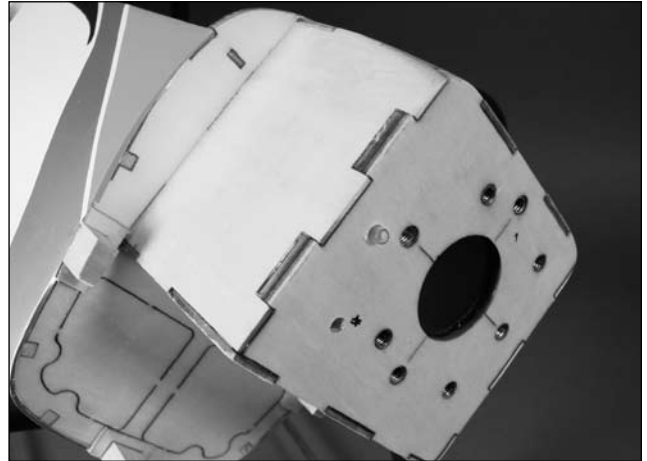
### □ Step 10

Use a drill and 5/32-inch (4mm) drill bit to drill a hole in the firewall for the throttle pushrod tube.



### □ Step 11

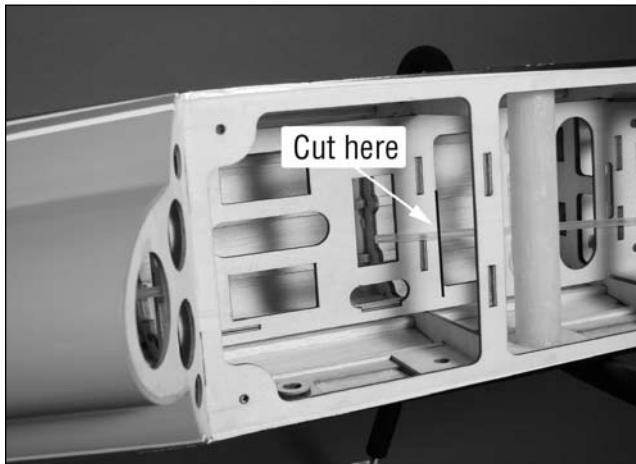
Roughen the pushrod tube using sandpaper. Slide the tube into the hole drilled in the previous step. Use medium CA to glue the pushrod to the firewall. Leave about 1/16-inch (1.5mm) protruding beyond the front of the firewall.



## Section 3: Engine Installation: 4-Stroke

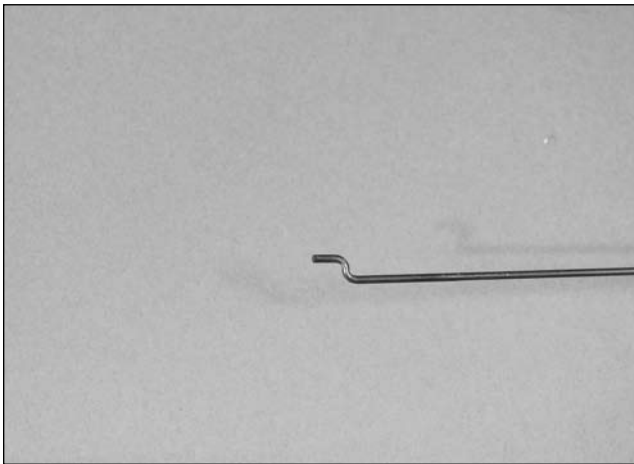
### □ Step 12

Use side cutters to trim the throttle pushrod at the location shown in the photo below.



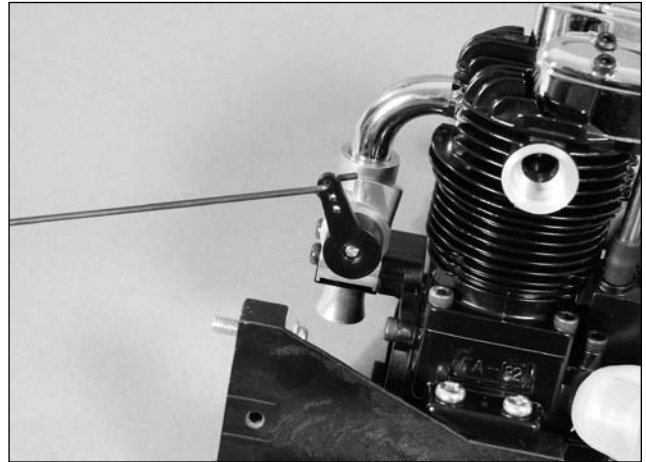
### □ Step 13

Make a Z-bend in the  $15\frac{7}{8}$ -inch (403mm) throttle pushrod. Make the bend on the end without the threads.



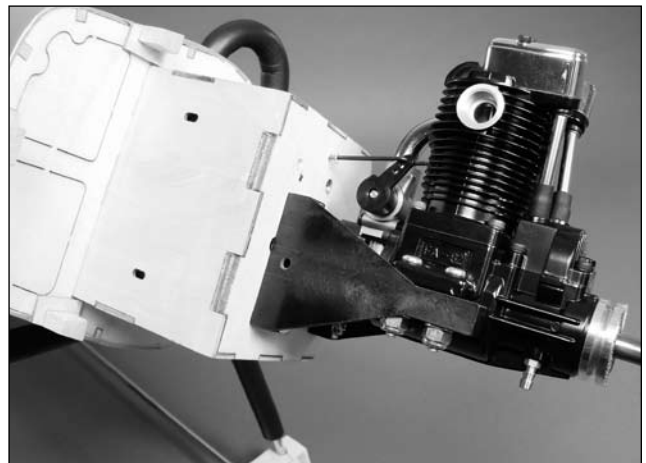
### □ Step 14

Attach the Z-bend to the carburetor as shown.



### □ Step 15

Position the engine back on the firewall, guiding the throttle pushrod into the pushrod tube.



## Section 3: Engine Installation: 4-Stroke

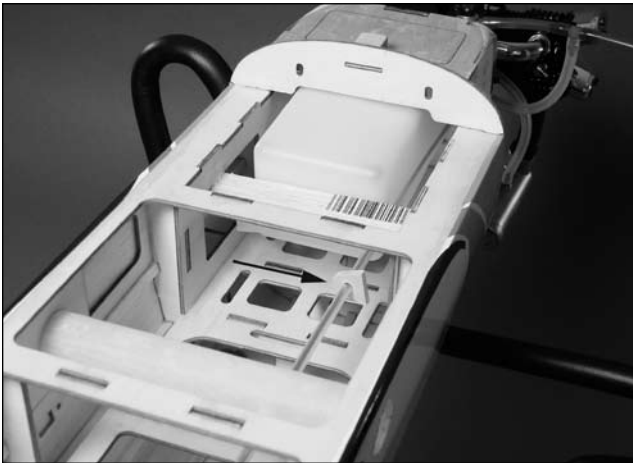
### □ Step 16

Slide the fuel tank into the fuselage. Make sure to locate the vent line from the fuel tank toward the top of the fuselage.



### □ Step 17

Secure the fuel tank inside the fuselage. Make sure to place foam at any points where the fuel tank contacts the airframe to help prevent vibrations from transferring to the fuel tank.



### □ Step 18

Connect the lines from the fuel tank to the engine and muffler. We used a fuel dot to allow fueling the tank from outside the cowling.



# Section 4: Throttle Servo Installation

## Required Parts

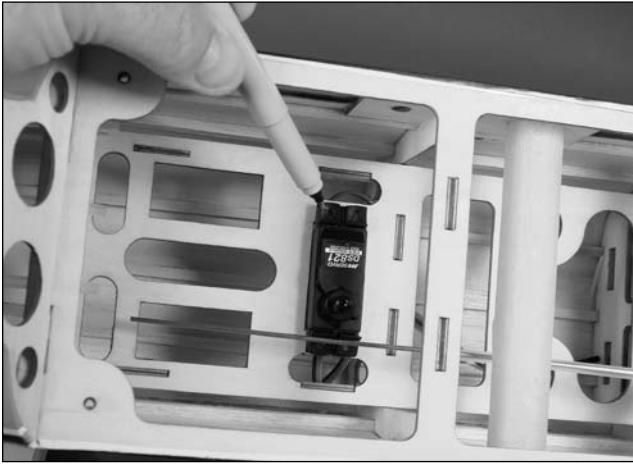
- Fuselage assembly
- Connector backplate
- Plywood pushrod standoff
- Brass connector

## Required Tools and Adhesives

- Drill
- Thin CA
- Side cutters
- Drill bit: 5/64-inch (2mm)
- Felt-tipped pen
- Phillips screwdriver
- Medium CA

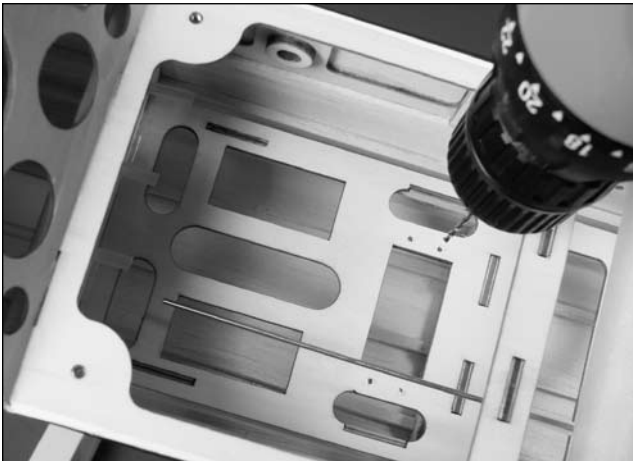
### Step 1

Position the servo with the output closest to the pushrod. Use a felt-tipped pen to mark the locations for the servo mounting screws.

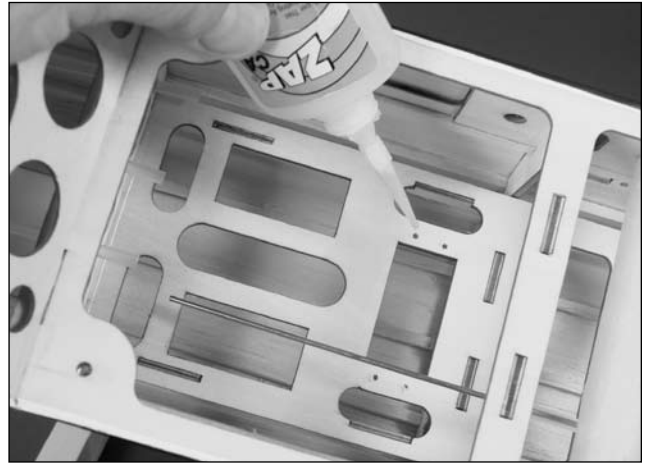


### Step 2

Drill the holes for the servo mounting screws using a drill and 5/64-inch (2mm) drill bit.

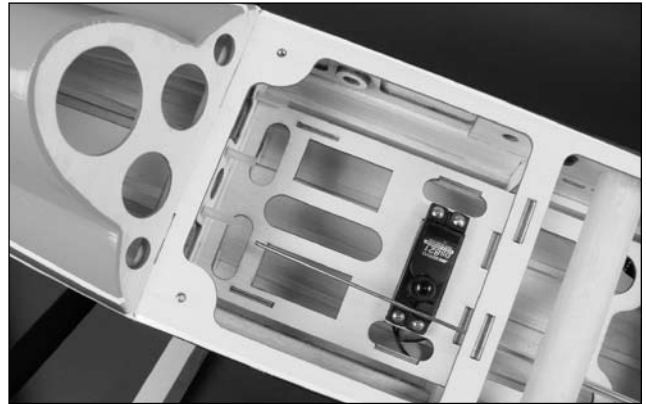


Use 2–3 drops of thin CA in each hole to harden the surrounding wood.



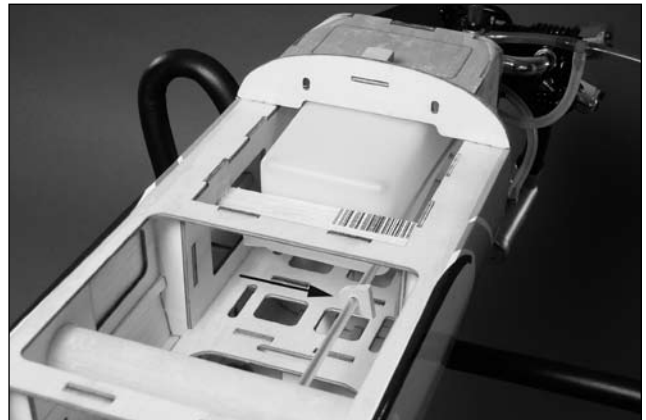
### Step 4

Secure the throttle servo using the screws provided with the servo.



### Step 5

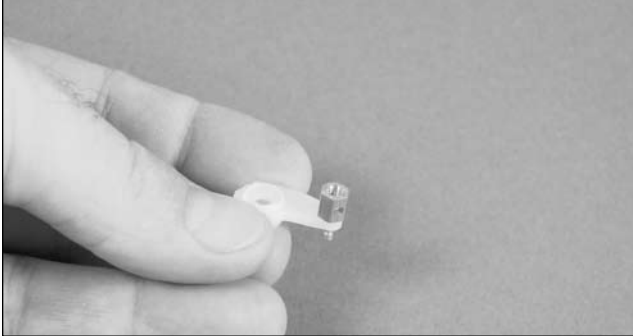
Slide the plywood pushrod standoff onto the pushrod tube. The exact location will be determined later in this section of the manual.



## Section 4: Throttle Servo Installation

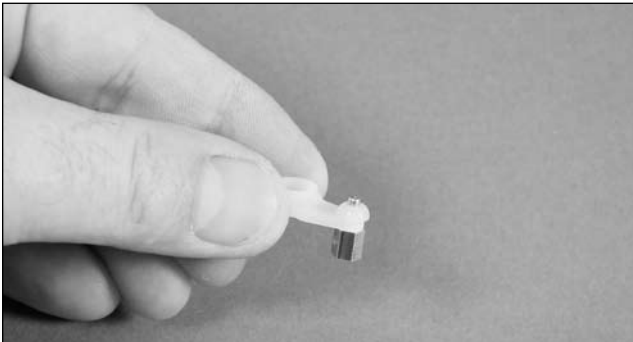
### □ Step 6

Enlarge the outer hole in the throttle servo horn using a 5/64-inch (2mm) drill bit and pin drill. Slide the brass connector into the hole as shown.



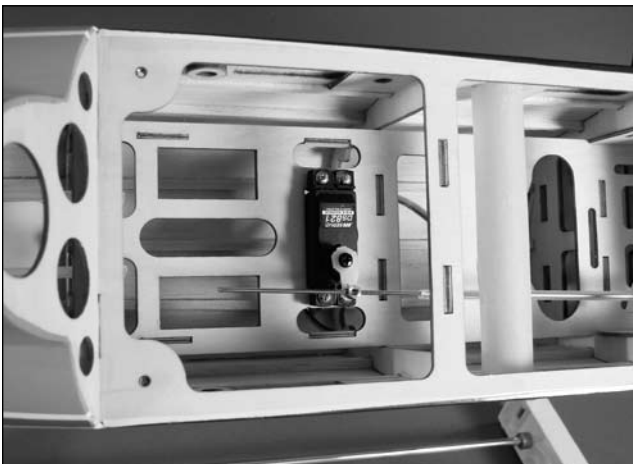
### □ Step 7

Secure the connector to the servo horn using the connector backplate.



### □ Step 8

With the radio system on, center the throttle stick and trim. Install the servo horn on the servo as shown.



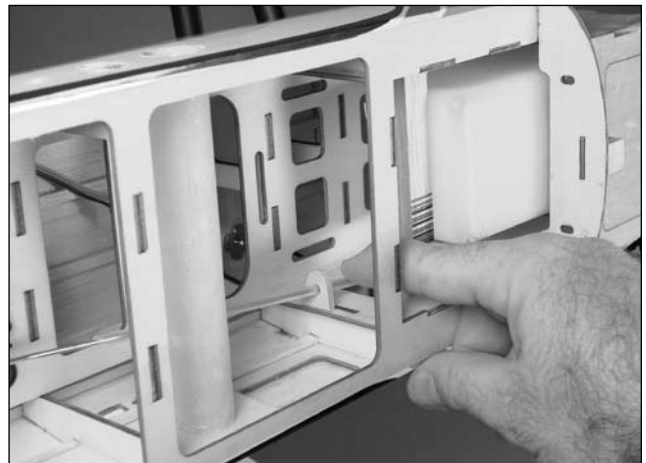
### □ Step 9

Secure the throttle pushrod in the brass connector using a 3mm x 4mm machine screw. Cut the pushrod wire so it extends only 1/8-inch (3mm) beyond the connector to prevent interference between the linkage and the tail servos. Use threadlock on the screw to prevent it from vibrating loose.



### □ Step 10

Slide the pushrod standoff so it can be glued to the side of the fuselage using medium CA as shown.





# Section 6: Electric Motor Installation

## Required Parts

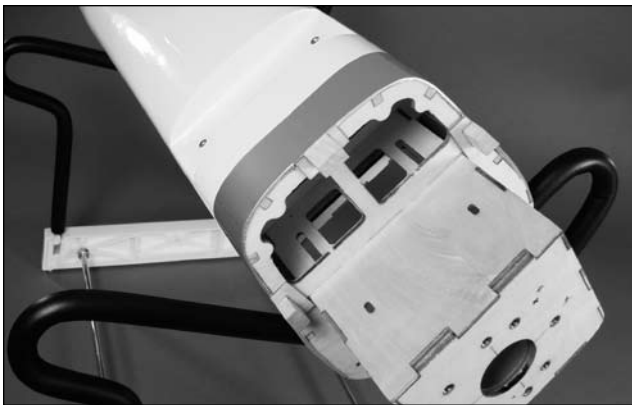
- Fuselage assembly
- Electronic speed control
- Aluminum standoff (4)
- Hook and loop strap (2)
- 8-32 x 2 1/4-inch machine screw (4)
- Motor w/hardware
- Motor battery
- Tie wrap

## Required Tools and Adhesives

- Threadlock
- Drill
- Drill bit: 5/32-inch (4mm)
- Hobby knife
- Covering iron

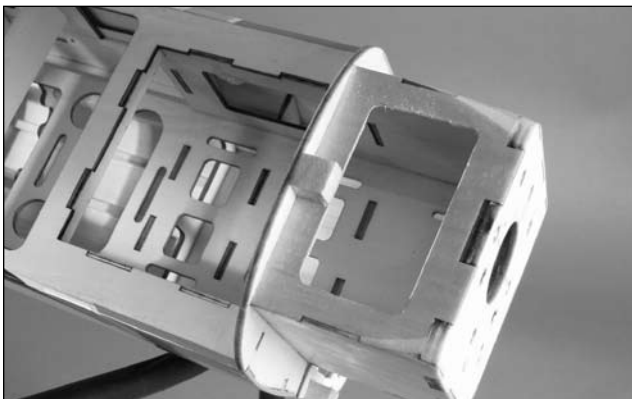
### □ Step 1

Use a hobby knife to remove the plywood from the sub-firewall to provide cooling air to pass through the fuselage. The plywood has been partially cut so all that is required is to score the plywood along the lines.



### □ Step 2

Use a hobby knife to remove the plywood from the top of the engine box to provide cooling air to pass through the fuselage. The plywood has been partially cut so all that is required is to score the plywood along the lines.



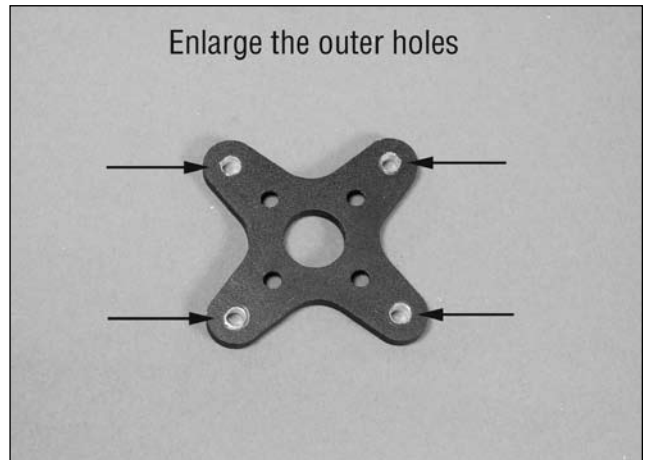
### □ Step 3

Use a hobby knife and a covering iron to open the cooling air exit in the bottom of the fuselage. Cutting the covering 1/8-inch (3mm) inside the opening and ironing the covering into the fuselage will leave a clean look to the bottom of the fuselage as shown.



### □ Step 4

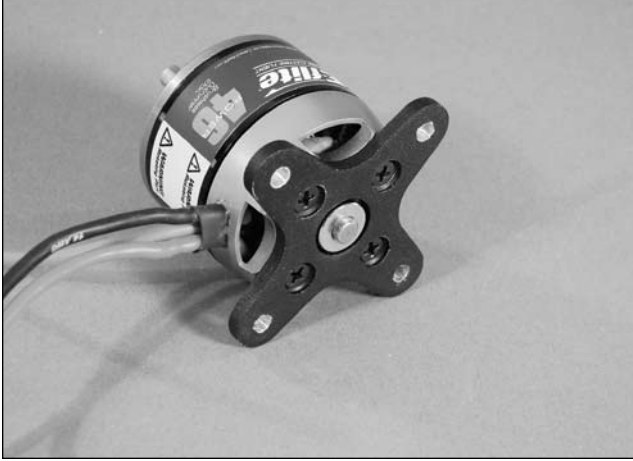
Use a drill and 5/32-inch (4mm) to enlarge the outer holes in the X-mount as shown.



## Section 6: Electric Motor Installation

### □ Step 5

Attach the X-mount to the motor using the screws provided with the motor. Make sure to use threadlock on the four screws to prevent them from vibrating loose.



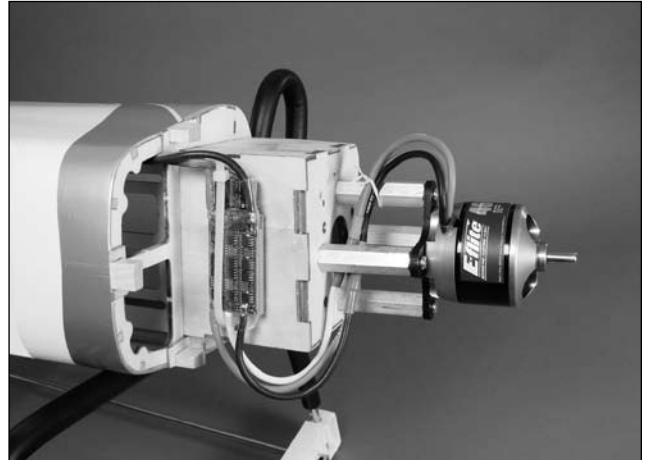
### □ Step 6

Attach the motor to the firewall using four aluminum standoffs and four 8-32 x 2 1/4-inch machine screws. Make sure to use threadlock on all the screws to prevent them from vibrating loose.



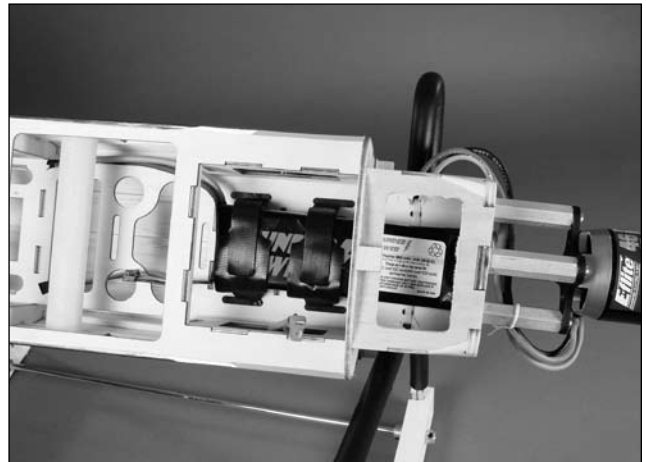
### □ Step 7

Secure the speed controller to the bottom of the fuselage using a tie wrap as shown. Secure the wires between the motor and speed control so they do not interfere with the operation of the motor.



### □ Step 8

Secure the motor battery inside the fuselage using the two hook and loop straps. If the battery moves fore or aft, use hook and loop (not provided) mounted directly to the battery and the tank floor to keep the battery secure inside the fuselage.



# Section 7: Wing and Cowling Installation

## Required Parts

- Fuselage assembly
- Propeller
- 1/4-20 x 1 3/8-inch nylon wing bolt (2)
- #4 x 1/2-inch sheet metal screw (4)
- Wing tube
- Spinner

## Required Tools and Adhesives

- Thin CA
- Hex wrench: 3/32-inch
- Card stock
- Drill bit: 1/16-inch (1.5mm), 1/8-inch (3mm), 3/8-inch (9.5mm)
- Drill
- Pin drill
- Low-tack tape

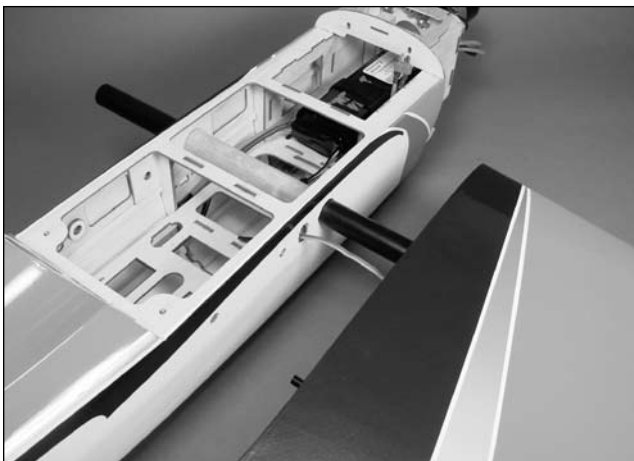
### Step 1

Slide the wing tube into one of the wing panels.



### Step 2

Slide the wing panel and wing tube into the fuselage. Guide the servo lead from the aileron servo into the hole behind the wing tube.



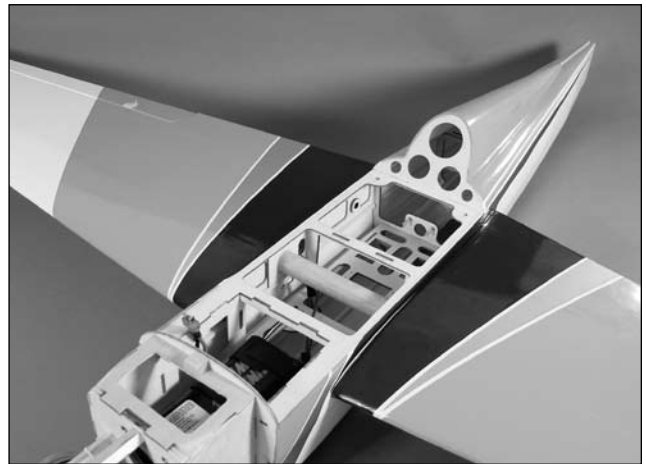
### Step 3

Secure the wing to the fuselage using a 1/4-20 x 1 3/8-inch nylon wing bolt.



### Step 4

Slide the remaining wing panel in position and secure it using a 1/4-20 x 1 3/8-inch nylon wing bolt.



## Section 7: Wing and Cowling Installation

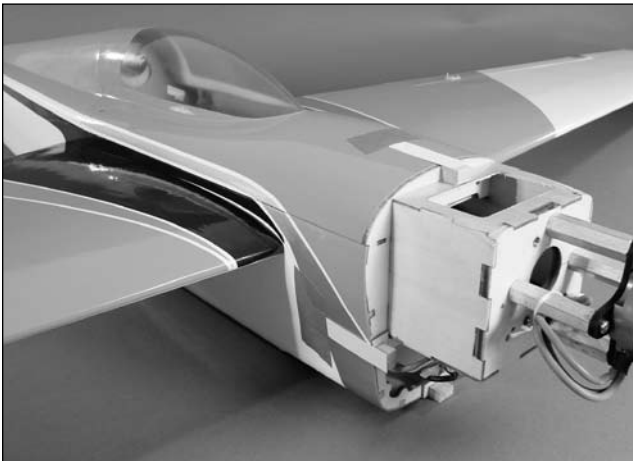
### Step 5

Attach the canopy back onto the fuselage.



### Step 6

Cut and tape pieces of card stock on the fuselage to locate the cowl mounting blocks.



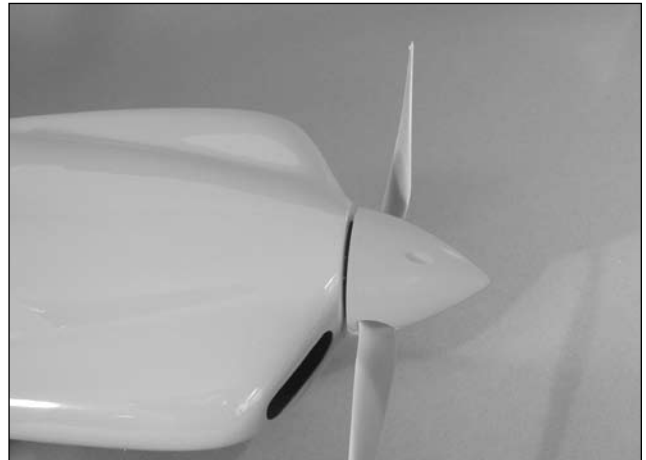
### Step 7

Slide the cowling on the fuselage. Make sure the card stock is on the outside of the cowling.



### Step 8

Attach the propeller and spinner onto the motor/engine. Follow the instructions provided with your motor/engine for the propeller install.



## Section 7: Wing and Cowling Installation

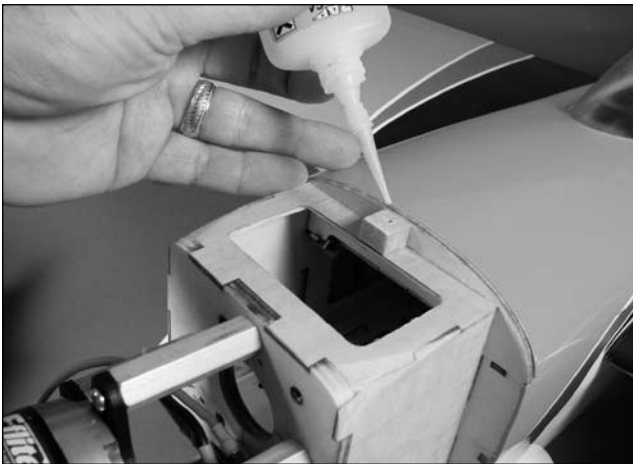
### □ Step 9

Use a pin drill and a 5/64-inch (2mm) drill bit to drill the four blocks for the cowl mounting screws.



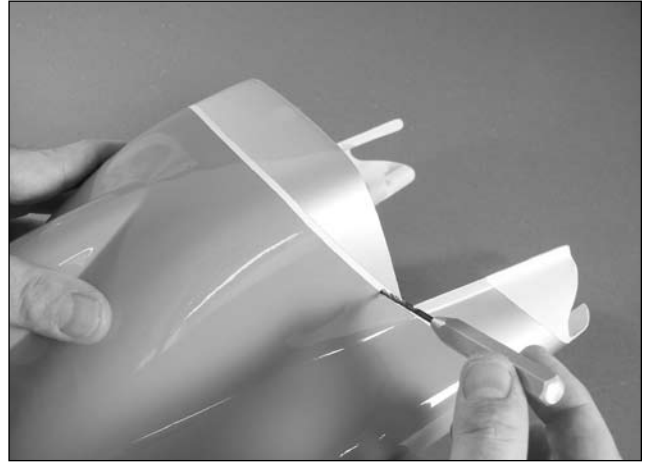
### □ Step 10

Use thin CA to harden the surrounding wood to help prevent the screws from vibrating loose.



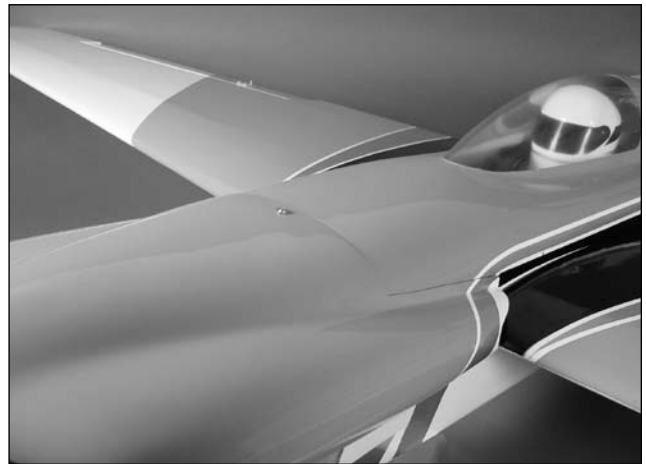
### □ Step 11

Enlarge the holes in the cowling ONLY using a pin drill and 1/8-inch (3mm) drill bit.



### □ Step 12

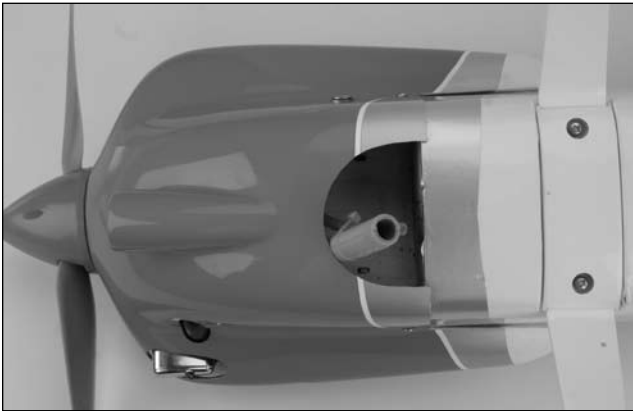
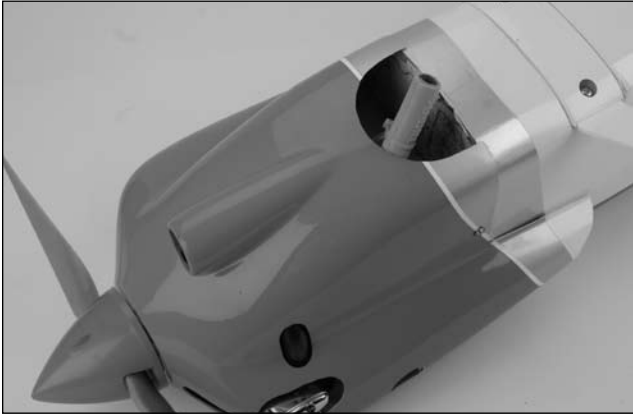
Secure the cowling to the fuselage using four #4 x 1/2-inch sheet metal screws.



## Section 7: Wing and Cowling Installation

### □ Step 13

Use the following images as a guide for cutting the cowling for a 4-stroke engine. Make sure to make cutouts for the rocker box covers, exhaust and needle valve. You will need to drill a 3/8-inch (9.5mm) hole in the cowl for mounting the fuel dot as well.



## Section 7: Wing and Cowling Installation

### □ Step 14

Use the following images as a guide for cutting the cowling for a 2-stroke engine. Make sure to make cutouts for glow plug access, muffler and needle valve. You will need to drill a 3/8-inch (9.5mm) hole in the cowling for mounting the fuel dot as well.



# Section 8: Tail Installation

## Required Parts

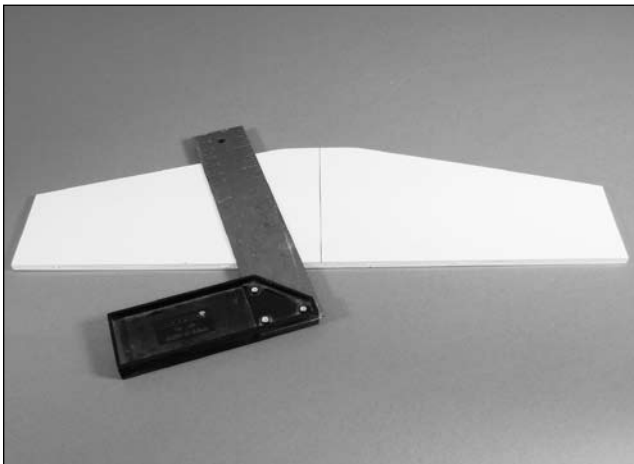
- Fuselage assembly
- Elevator joiner wire
- CA hinge (6)
- Stabilizer
- Elevator (2)
- Rudder/fin assembly

## Required Tools and Adhesives

- Threadlock
- Square
- Sandpaper
- T-pin (6)
- 30-minute epoxy
- Drill bit: 1/16-inch (1.5mm)
- Ruler
- Felt-tipped pen
- Hobby knife
- Thin CA
- Pin drill

### □ Step 1

Measure and mark a center line on the stabilizer as shown using a ruler and square.

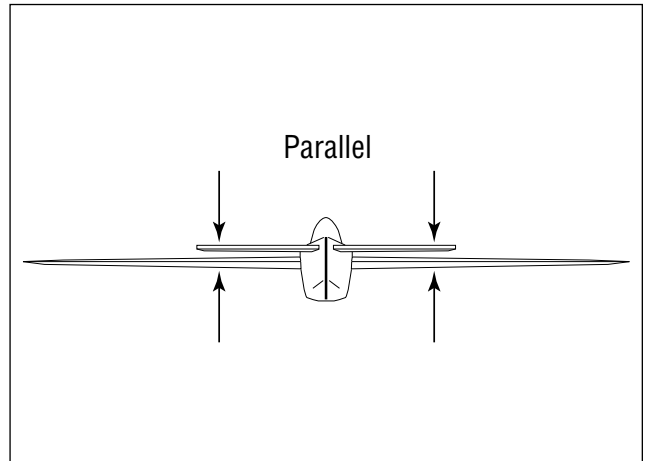


### □ Step 2

Slide the stabilizer into the slot in the rear of the fuselage. View through the slot for the fin to center the stabilizer using the line drawn in the previous step.

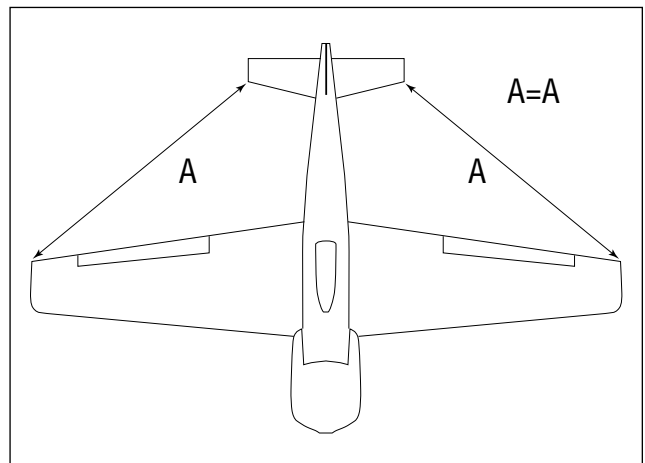
### □ Step 3

Stand back 8 feet (3 meters) and view the aircraft from the rear. The wing should be parallel to the stabilizer. If not, lightly sand the opening in the fuselage to correct the alignment.



### □ Step 4

Check the alignment between the wing and stabilizer. The distance between the wing tips and stabilizer tips must be equal. If not, reposition the stabilizer to correct for any differences.

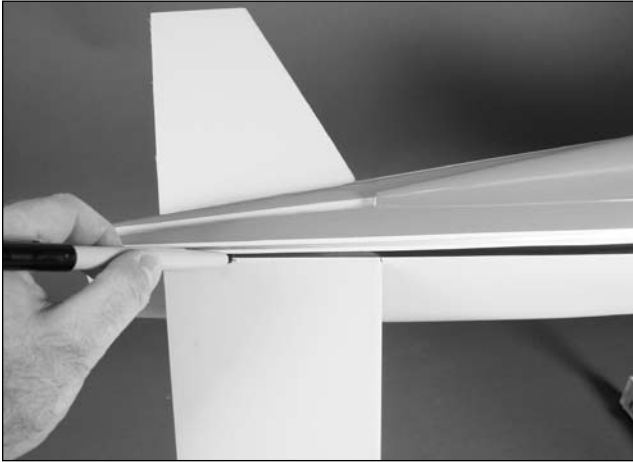




## Section 8: Tail Installation

### □□ Step 5

Use a felt-tipped pen to trace the outline of the fuselage onto both the top and bottom of the stabilizer.



### □□ Step 6

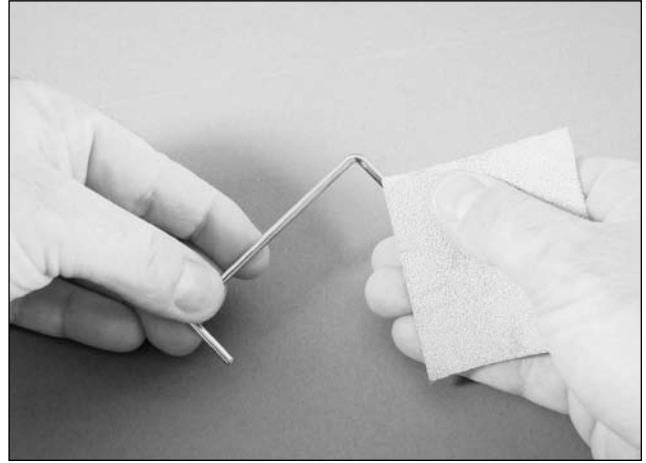
Trim the covering 1/16-inch (1.5mm) inside the lines and remove the covering from the stabilizer. Use care not to cut into the underlying wood which will weaken the stabilizer.



**Note:** Use either a hot knife or soldering iron to melt the covering, reducing the chance of cutting into the stabilizer.

### □ Step 7

Use sandpaper to roughen the ends of the stabilizer joiner. This will provide a better bond between it and the elevators.



### □ Step 8

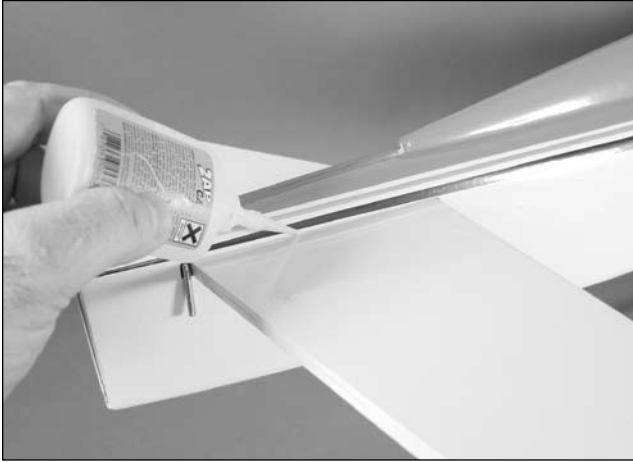
Slide the joiner wire into the fuselage, then the stabilizer. Make sure the joiner wire is positioned before gluing the stabilizer in position.



## Section 8: Tail Installation

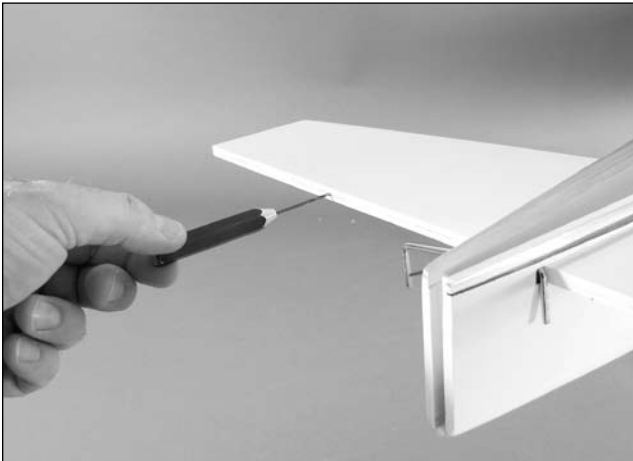
### □ Step 9

Use thin CA to glue the stabilizer into the fuselage. Apply the CA at the intersection of the fuselage and stabilizer on both the top and bottom. Also apply CA to the exposed stabilizer through the slot for the fin. Do not use accelerator, as the CA must be allowed to wick into the surrounding wood. Make 2–3 applications of thin CA before proceeding.



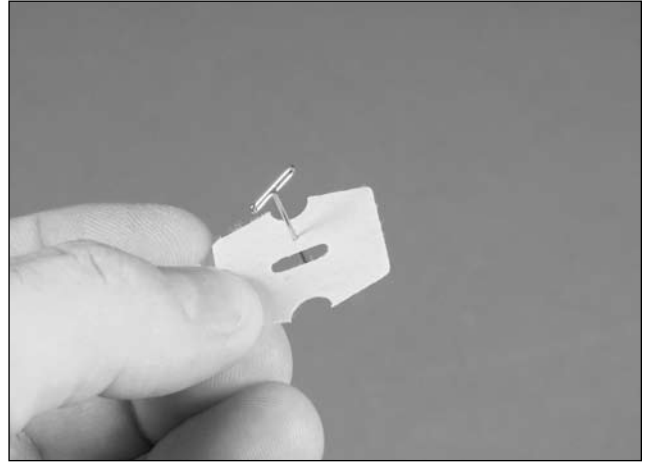
### □ Step 10

Use a pin drill with a 1/16-inch (1.5mm) drill bit to drill a hole in the center of each of the hinge slots on both the stabilizer and elevator. This creates a tunnel for the CA to wick farther into the hinge, resulting in a better bond between the hinge and surrounding wood.



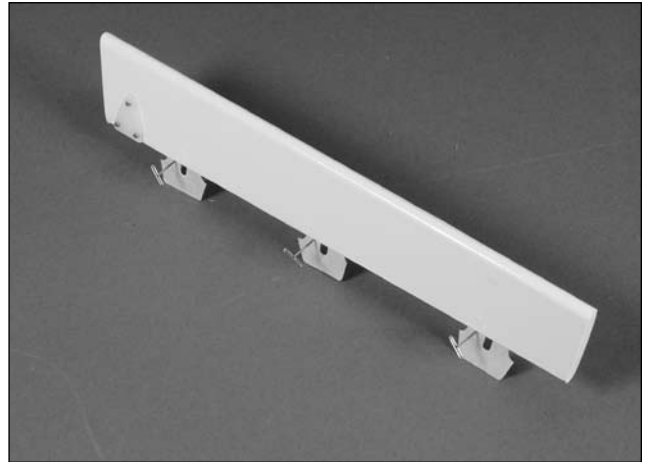
### □ Step 11

Place a T-pin in the center of each of the six CA hinges as shown in the below photo.



### □ Step 12

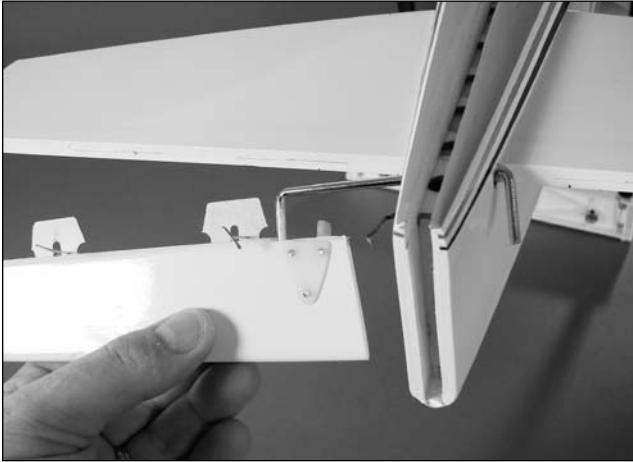
Slide each of the hinges in the slots for the elevators. The T-pins will rest against the elevator as seen.



## Section 8: Tail Installation

### □□ Step 13

Slide the elevator onto the joiner wire. Note the location of the elevator control horn.



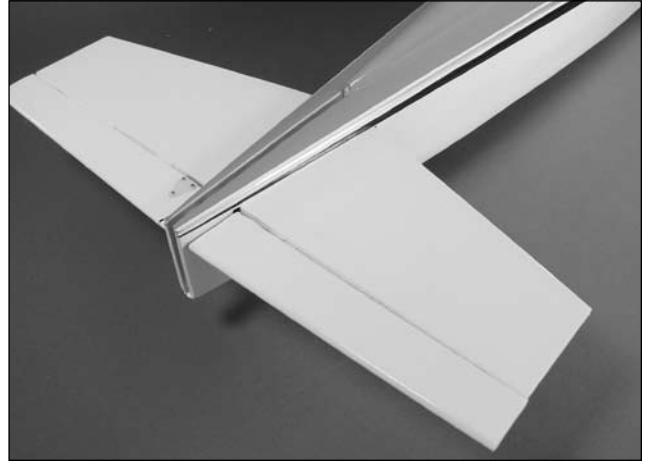
### □□ Step 14

Check the fit of the hinges from the elevator into the slots in the stabilizer. The elevator will fit tightly against the stabilizer when installed.



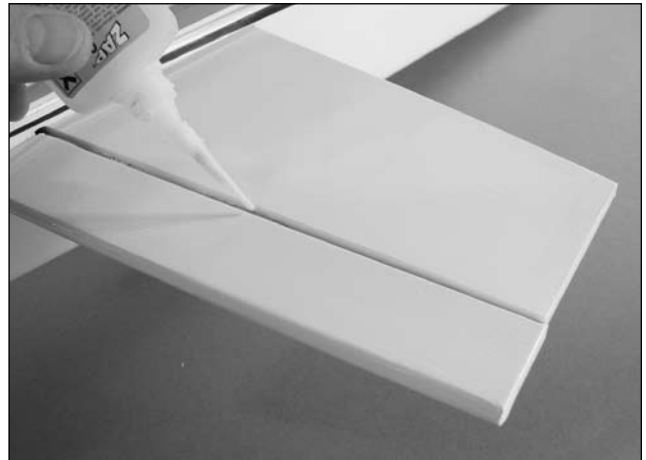
### □ Step 15

Repeat Steps 13 and 14 to check the fit of the remaining elevator. Use 30-minute epoxy on the joiner wire and elevators to glue them together.



### □ Step 16

Wick thin CA into each of the six hinges on both the top and bottom of the stabilizer. Do not use accelerator on the hinges, as this will not allow the CA to fully wick into the hinges.



## Section 8: Tail Installation

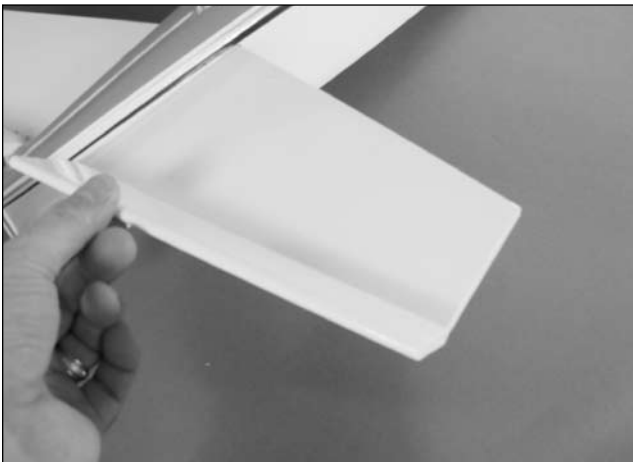
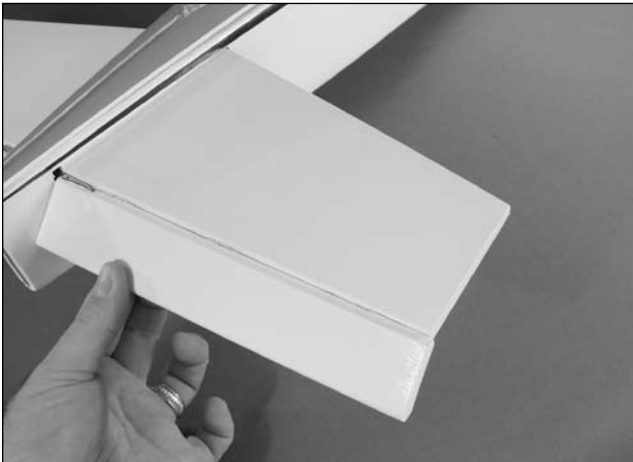
### □ Step 17

After the CA has been allowed to cure, lightly pull on the elevators and stabilizer to make sure the hinges are glued securely.



### □ Step 18

Flex the elevators up and down a few times to break in the hinges and reduce the load on the servos.



### □ Step 19

Fit the fin into the fuselage and check that it is square to the stabilizer. Lightly sand the fuselage to correct for any alignment problems.



### □ Step 20

Installing the fin follows the steps similar to installing the stabilizer. You will need to follow Steps 5 and 6 to remove the covering from the bottom of the fin where it contacts the fuselage. Use 30-minute epoxy when gluing the fin to the fuselage.



# Section 9: Landing Gear Installation

## Required Parts

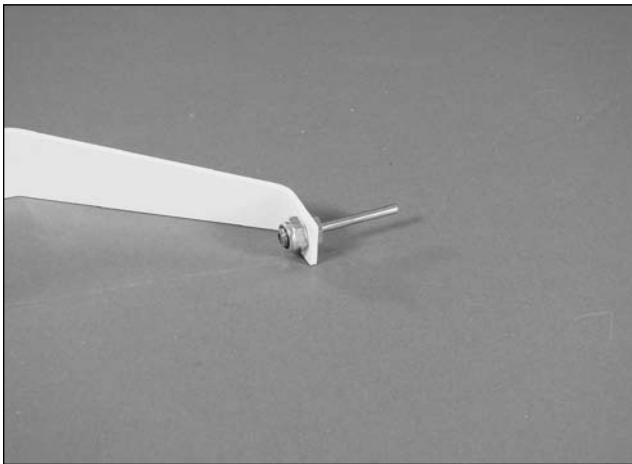
- Fuselage assembly
- Axle w/nut (2)
- 2 1/2-inch (63mm) wheel (2)
- Wheel pant (right and left)
- 1/16-inch wheel collar (2)
- 5/32-inch wheel collar (4)
- 3mm x 4mm machine screw (4)
- 8-32 x 3/4-inch machine screw (2)
- 4-40 x 3/8-inch socket head machine screw (2)
- Landing gear
- Landing gear fairing
- 1-inch (25mm) wheel
- #4 washer (2)

## Required Tools and Adhesives

- Threadlock
- Adjustable wrench (2)
- Hex wrench (included)
- File
- Medium CA

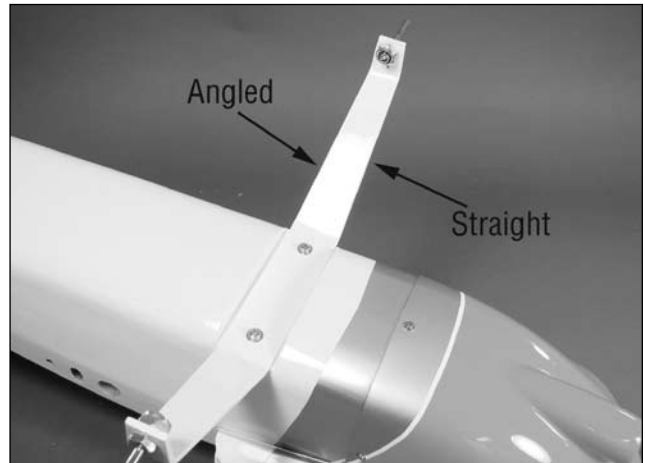
### □ Step 1

Use two adjustable wrenches to attach the axles to the landing gear.



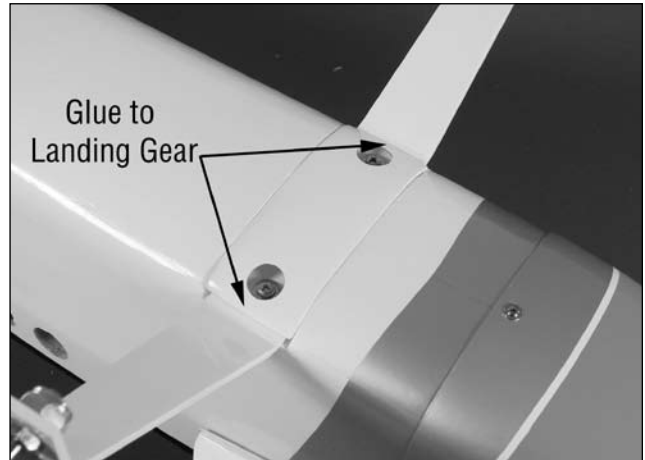
### □ Step 2

Attach the landing gear to the fuselage using two 8-32 x 3/4-inch machine screws and two #8 washers. Make sure to use threadlock on the screws to prevent them from vibrating loose.



### □ Step 3

Use medium CA to glue the landing gear fairing to the landing gear as shown. This will allow you to remove the gear without destroying the fairing in the process.



## Section 9: Landing Gear Installation

### □ Step 4

Use a file to create a flat on both axles. This gives the screws in the wheel collars something to bite into, making them more secure on the axles.



### □ Step 5

Slide a 5/32-inch wheel collar onto the axle and use a 3mm x 4mm machine screw to keep it in position for the next few steps.



### □ Step 6

Slide the wheel onto the axle, then another 5/32-inch wheel collar onto the axle. Use a 3mm x 4mm machine screw to keep the wheel and collar in position.



### □ Step 7

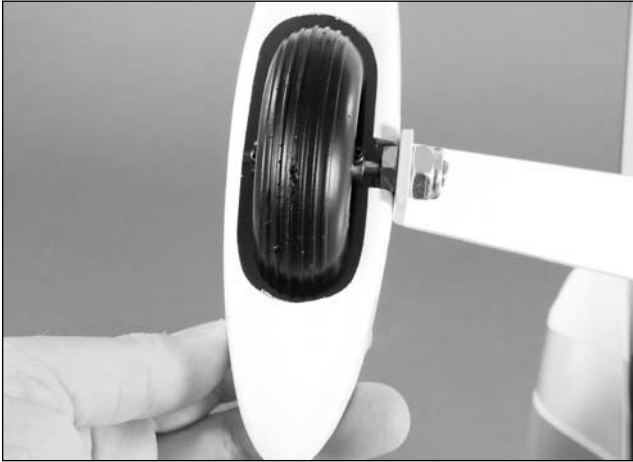
Secure the wheel pant to the landing gear using a 4-40 x 3/8-inch socket head machine screw and a #4 washer. Use threadlock on the screw to prevent vibrations from loosening the screw.



## Section 9: Landing Gear Installation

### □ Step 8

Loosen the machine screws holding the wheel collars and position the wheel so it does not rub on the wheel pant. Tighten the screws to secure the position of the wheel collars. Make sure to use threadlock on both machine screws so they do not vibrate loose.



### □ Step 9

The tail wheel is installed following the same procedure as the main wheels, only you will be using two 1/16-inch wheel collars with setscrews and will be tightening them using the provided hex wrench. Again, use threadlock on the setscrews to prevent vibration from causing the loss of your tail wheel.



## Section 10: Radio and Pilot Installation

### Required Parts

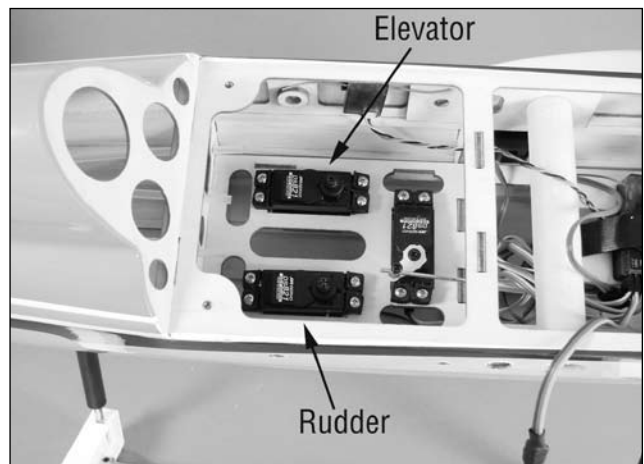
- Fuselage assembly
- Pilot support brace
- Switch harness
- Clevis (2)
- Snap link (2)
- 24<sup>3</sup>/<sub>4</sub>-inch (630mm) threaded pushrod (rudder)
- 23<sup>1</sup>/<sub>4</sub>-inch (590mm) threaded pushrod (elevator)
- Pilot
- Receiver
- Y-harness
- Clevis retainer (2)

### Required Tools and Adhesives

- Phillips screwdriver
- Pin drill
- Drill bit: 5/64-inch (2mm)
- Thin CA
- Medium CA
- Pliers

### □ Step 1

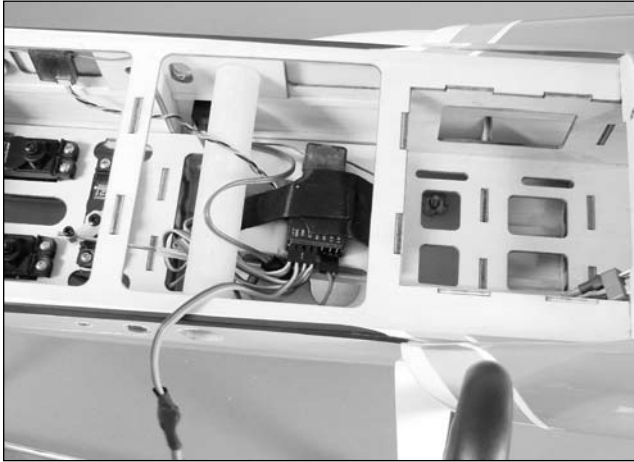
Install the rudder and elevator servos in the fuselage.



## Section 10: Radio and Pilot Installation

### □ Step 2

Wrap the receiver battery in foam and secure it inside the fuselage. The receiver is placed on top of the battery (or locate as necessary to achieve balance). Make sure to isolate the receiver from vibrations by placing foam between it and the fuselage structure.



**Note:** When using a remote receiver, place it as far as possible from the main receiver and at a different level in the fuselage for the best results. The higher the remote receiver can be mounted in the fuselage the better.

### □ Step 3

Secure the switch to the side of the fuselage. When using a glow engine, the switch will be on the side of the fuselage opposite the exhaust.



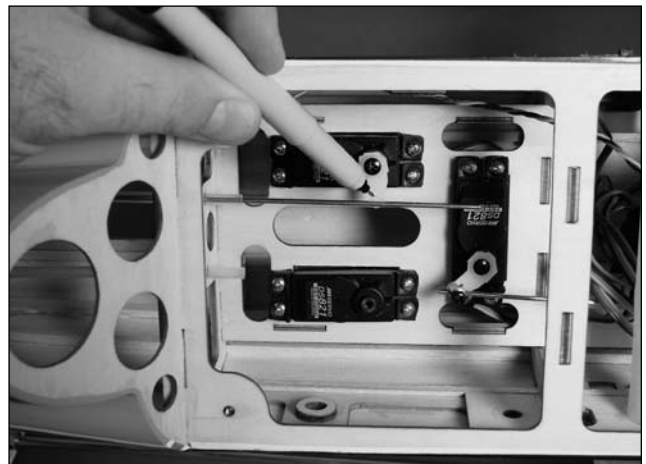
### □ Step 4

Thread a clevis onto the  $23\frac{1}{4}$ -inch (590mm) threaded pushrod for the elevator. Slide the pushrod into the tube nearest the elevator control horn and attach the clevis to the horn as shown.



### □ Step 5

Use a felt-tipped pen to mark the pushrod where it crosses the outer hole on the servo horn.

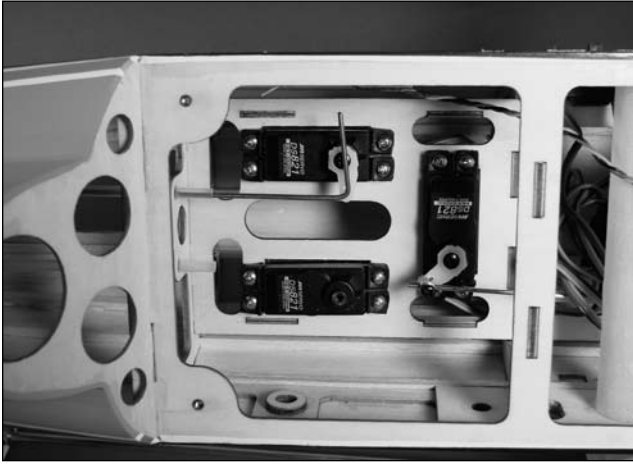




## Section 10: Radio and Pilot Installation

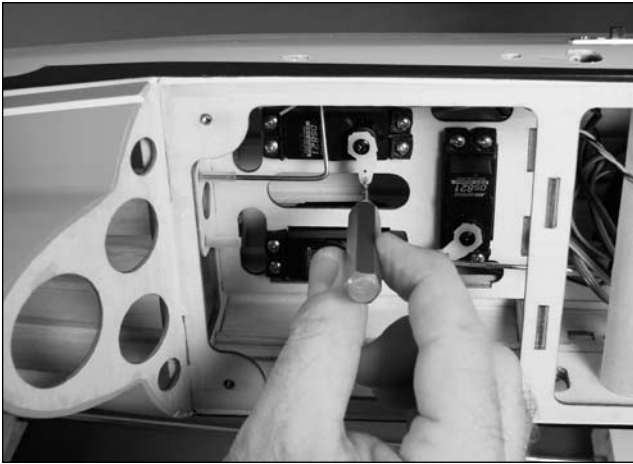
### □□ Step 6

Use a pair of pliers to make a 90-degree bend in the pushrod at the mark made in the previous step.



### □□ Step 7

Use a pin drill and a 5/64-inch (2mm) drill bit to enlarge the outer hole in the servo arm.



### □□ Step 8

Slide the pushrod wire through the hole in the servo horn. Slide the snap link onto the pushrod wire, then rotate it until it snaps on the wire.



### □□ Step 9

Use side cutters to remove the excess wire. Leave at least 1/16-inch (1.5mm) exposed beyond the connector to prevent the wire from coming out of the connector.



## Section 10: Radio and Pilot Installation

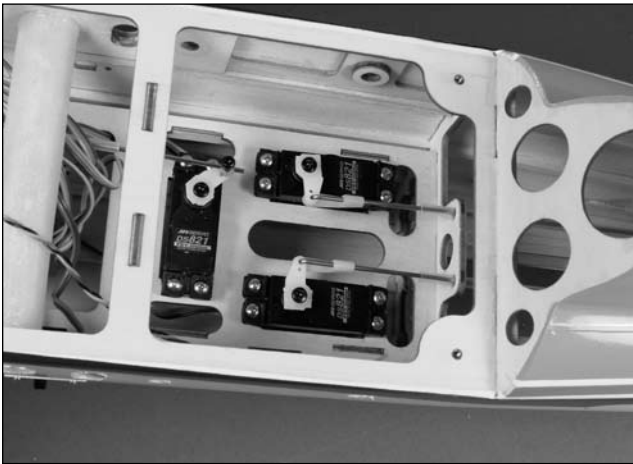
### □ Step 10

Thread a clevis onto the  $24\frac{3}{4}$ -inch (630mm) threaded pushrod for the rudder. Slide the pushrod into the tube nearest the rudder control horn and attach the clevis to the horn as shown.



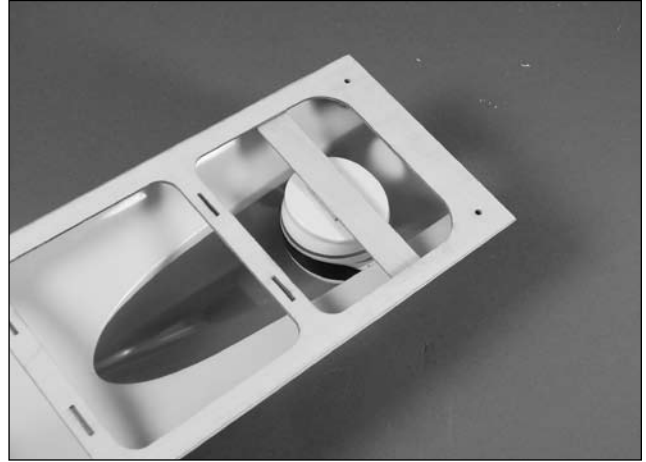
### □ Step 11

Repeat Steps 5 through 10 to connect the rudder pushrod to the rudder servo horn.



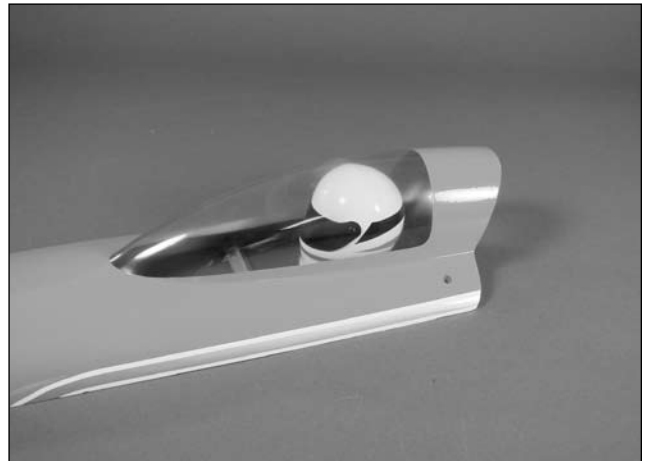
### □ Step

Use medium CA to glue the pilot to the support.



### □ Step

Position the pilot as shown in the canopy. The support brace is then glued to the canopy using medium CA.



## Section 11: Control Throws

The amount of control throw should be adjusted as closely as possible using mechanical means, rather than making large changes electronically at the radio. By moving the position of the clevis at the control horn toward the outermost hole, you will decrease the amount of control throw of the control surface. Moving it toward the control surface will increase the amount of throw. Moving the pushrod wire at the servo arm will have the opposite effect: Moving it closer to center will decrease throw, and away from center will increase throw. Work with a combination of the two to achieve the closest or exact control throws listed.

Aileron Low Rate      5/16-inch (8mm) up/down  
Aileron High Rate     7/16-inch (11mm) up/down

Elevator Low Rate     3/16-inch (5mm) up/down  
Elevator High Rate    5/16-inch (8mm) up/down

Rudder Low Rate      7/16-inch (11mm) right/left  
Rudder High Rate     3/4-inch (19mm) right/left

**Note:** All control throws are measured at the widest point of the control surface.

Once the control throws have been set, slide the clevis retainers over the clevis to prevent them from opening during flight.

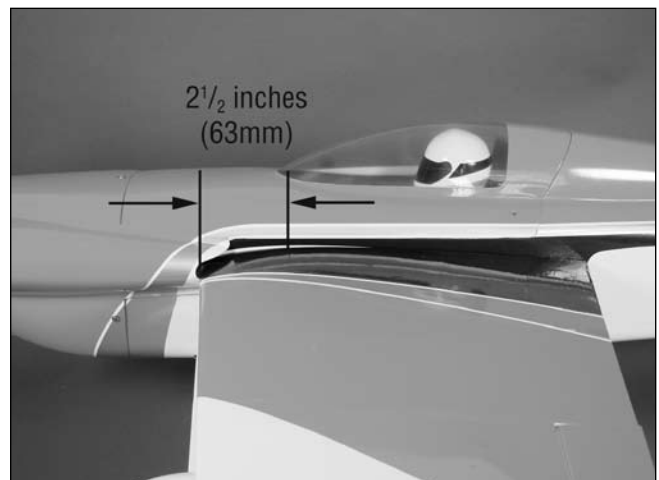


## Section 12: Recommended Center of Gravity (CG)

An important part of preparing the aircraft for flight is properly balancing the model. This is especially important when various engines are mounted.

**Caution:** Do not inadvertently skip this step!

The recommended Center of Gravity (CG) location for the Sundowner 50 is 2 1/2 inches (63mm) behind the leading edge of the wing against the fuselage. If necessary, move the battery pack or add weight to either the nose or the tail until the correct balance is achieved. Stick-on weights are available at your local hobby store and work well for this purpose.



## Section 13: Pre-Flight

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Charge both the transmitter and receiver pack for your airplane. Use the recommended charger supplied with your particular radio system, following the instructions provided with the radio. In most cases, the radio should be charged the night before going out flying.

Check the radio installation and make sure all the control surfaces are moving correctly (i.e. the correct direction and with the recommended throws). Test run the engine and make sure it transitions smoothly from idle to full throttle and back. Also ensure the engine is tuned according to the manufacturer's instructions, and it will run consistently and constantly at full throttle when adjusted.

Check all the control horns, servo horns and clevises to make sure they are secure and in good condition. Replace any items that would be considered questionable. Failure of any of these components in flight would mean the loss of your aircraft.

## Section 14: Adjusting the Engine

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### Step 1

Completely read the instructions included with your engine and follow the recommended break in procedure.

### Step 2

At the field, adjust the engine to a slightly rich setting at full throttle and adjust the idle and low-speed needle so that a consistent idle is achieved.

### Step 3

Before you fly, be sure that your engine idles reliably, transitions and runs at all throttle settings. Only when this is achieved should any plane be considered ready for flight.

## Section 15: Range Test Your Radio

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Range check your radio system before each flying session. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the radio in your airplane. With your airplane on the ground, you should be able to walk 30 paces away from your airplane and still have complete control of all functions. If not, don't attempt to fly! Have your radio equipment checked out by the manufacturer.



# 2007 Official AMA National Model Aircraft Safety Code

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## GENERAL

1. A model aircraft shall be defined as a non-human-carrying device capable of sustained flight in the atmosphere. It shall not exceed limitations established in this code and is intended to be used exclusively for recreational or competition activity.
2. The maximum takeoff weight of a model aircraft, including fuel, is 55 pounds, except for those flown under the AMA Experimental Aircraft Rules.
3. I will abide by this Safety Code and all rules established for the flying site I use. I will not willfully fly my model aircraft in a reckless and/or dangerous manner.
4. I will not fly my model aircraft in sanctioned events, air shows, or model demonstrations until it has been proven airworthy.
5. I will not fly my model aircraft higher than approximately 400 feet above ground level, when within three (3) miles of an airport without notifying the airport operator. I will yield the right-of-way and avoid flying in the proximity of full-scale aircraft, utilizing a spotter when appropriate.
6. I will not fly my model aircraft unless it is identified with my name and address, or AMA number, inside or affixed to the outside of the model aircraft. This does not apply to model aircraft flown indoors.
7. I will not operate model aircraft with metal-blade propellers or with gaseous boosts (other than air), nor will I operate model aircraft with fuels containing tetranitromethane or hydrazine.
8. I will not operate model aircraft carrying pyrotechnic devices which explode burn, or propel a projectile of any kind. Exceptions include Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight. Rocket motors up to a G-series size may be used, provided they remain firmly attached to the model aircraft during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code; however, they may not be launched from model aircraft. Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Air Show Advisory Committee Document.
9. I will not operate my model aircraft while under the influence of alcohol or within eight (8) hours of having consumed alcohol.
10. I will not operate my model aircraft while using any drug which could adversely affect my ability to safely control my model aircraft.
11. Children under six (6) years old are only allowed on a flightline or in a flight area as a pilot or while under flight instruction.
12. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

# 2007 Official AMA National Model Aircraft Safety Code

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## Radio Control

1. All model flying shall be conducted in a manner to avoid over flight of unprotected people.
2. I will have completed a successful radio equipment ground-range check before the first flight of a new or repaired model aircraft.
3. I will not fly my model aircraft in the presence of spectators until I become a proficient flier, unless I am assisted by an experienced pilot.
4. At all flying sites a line must be established, in front of which all flying takes place. Only personnel associated with flying the model aircraft are allowed at or in front of the line. In the case of airshows demonstrations straight line must be established. An area away from the line must be maintained for spectators. Intentional flying behind the line is prohibited.
5. I will operate my model aircraft using only radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.
6. I will not knowingly operate my model aircraft within three (3) miles of any preexisting flying site without a frequency-management agreement. A frequency-management agreement may be an allocation of frequencies for each site, a day-use agreement between sites, or testing which determines that no interference exists. A frequency-management agreement may exist between two or more AMA chartered clubs, AMA clubs and individual AMA members, or individual AMA members. Frequency-management agreements, including an interference test report if the agreement indicates no interference exists, will be signed by all parties and copies provided to AMA Headquarters.
7. With the exception of events flown under official AMA rules, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and located at the flight line.
8. Under no circumstances may a pilot or other person touch a model aircraft in flight while it is still under power, except to divert it from striking an individual.
9. Radio-controlled night flying is limited to low-performance model aircraft (less than 100 mph). The model aircraft must be equipped with a lighting system which clearly defines the aircraft's attitude and direction at all times.
10. The operator of a radio-controlled model aircraft shall control it during the entire flight, maintaining visual contact without enhancement other than by corrective lenses that are prescribed for the pilot. No model aircraft shall be equipped with devices which allow it to be flown to a selected location which is beyond the visual range of the pilot.



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