

# HANGAR 9™

## *Piper J-3 Cub 40*

### ASSEMBLY MANUAL



#### Specifications

Wingspan: ..... 80" (2032mm)  
Fuselage length: ..... 49.9" (1268mm)  
Wing area: ..... 919 sq. in. (59.3 sq dm)

Weight: ..... 6.75–7.5 lbs (3–3.4 kg)  
Engine: ..... .36–.46 2-stroke, .56–.82 4-stroke  
Radio: ..... 4-channel w/ 5 servos

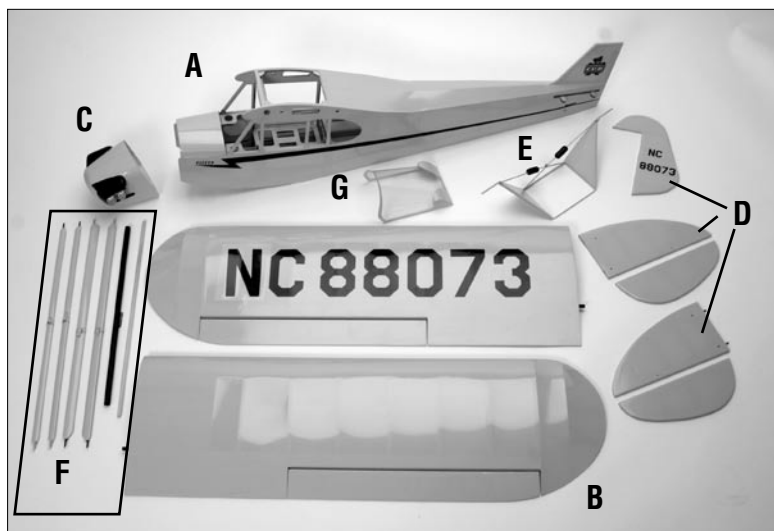
# Table of Contents

---

Contents of Kit . . . . .	3
Additional Required Equipment . . . . .	3
Covering Colors . . . . .	3
Additional Required Tools and Adhesives . . . . .	4
Field Equipment Required . . . . .	4
Warning . . . . .	4
Using the Manual . . . . .	4
Before Starting Assembly . . . . .	5
Warranty Information . . . . .	5
Section 1: Hinge Installation . . . . .	6
Section 2: Engine Installation . . . . .	9
Section 3: Servo Installation (Aileron) . . . . .	11
Section 4: Servo Installation (Fuselage) . . . . .	15
Section 5: Window Installation . . . . .	20
Section 6: Landing Gear Installation . . . . .	21
Section 7: Installing the Stabilizer . . . . .	23
Section 8: Cowling Installation . . . . .	26
Section 9: Wing Installation . . . . .	28
Adjusting the Engine . . . . .	31
Control Throws . . . . .	31
Recommended CG . . . . .	32
Preflight . . . . .	32
Range Testing the Radio . . . . .	33
2005 Official AMA National Model Aircraft Safety Code . . . . .	34

# Contents of Kit

---



## Large Parts:

A. Fuselage	HAN4002
B. Wing	HAN4001
C. Cowling	HAN4004
D. Tail Set	HAN4003
E. Landing Gear	HAN4005
F. Wing Strut Set	HAN4010
G. Window Set	HAN4008

## Items Not Shown:

Fuel Tank	
Tail Wheel Assembly	HAN4007
Decal Set	HAN4009
Pushrod Set	HAN4011
Wheels	HAN4006
Top Fuselage Hatch	HAN4012

# Additional Required Equipment

---

## Radio Equipment

- 4-channel radio system (minimum)
- 5 standard servos
- Receiver
- Receiver battery
- Switch harness
- 12" Servo Extension (JRPA098) (2)
- "Y" Harness (JRPA135)
- Large Arms/Horns w/Screw (JRPA212)

## Recommended JR® Systems

- PCM10X
- XP9303
- XP8103
- X-378
- XP6102
- XF631
- XF421
- Quattro



JR XP9303

## Recommended Engine

- Evolution® .36-.46
- Saito™ .56-.82 4-stroke



JR XP6102

# Covering Colors

---

- |              |         |
|--------------|---------|
| • Cub Yellow | HANU884 |
| • Black      | HANU874 |

# Additional Required Tools and Adhesives

---

## Tools

- Adjustable wrench
- Crimping tool
- Drill
- Drill bit: 1/16", 5/64", 3/32"
- Felt-tipped pen
- Heat gun
- Hobby knife
- Hobby scissors
- Petroleum jelly
- Phillips screwdriver (small)
- Phillips screwdriver (large)
- Pliers
- Rotary tool w/sanding drum
- Ruler
- Sandpaper
- String
- Threadlock
- T-pins

## Adhesives

- 6-minute epoxy
- Thin CA
- Medium CA

## Other Required Items

- Epoxy brushes
- Felt-tipped pen or pencil
- Measuring device (e.g. ruler, tape measure)
- Mixing sticks for epoxy
- Paper towels
- Petroleum jelly
- Rubbing alcohol
- Sanding bar
- Covering Iron (HAN101)
- Covering Glove (HAN150)
- Sealing Iron Sock (HAN141)

# Field Equipment Required

---

- Propeller
- Fuel
- Glow Plug Wrench (HAN2510)
- Glow Plug Igniter with Charger (HAN7101)
- Glow Plug (HAN3001/3006)
- Manual Fuel Pump (HAN118)

# Warning

---

An RC aircraft is not a toy! If misused, it can cause serious bodily harm and damage to property. Fly only in open areas, preferably at AMA (Academy of Model Aeronautics) approved flying sites, following all instructions included with your radio and engine.

# Using the Manual

---

This manual is divided into sections to help make assembly easier to understand, and to provide breaks between each major section. Remember to take your time and follow the directions.

## Before Starting Assembly

---

Before beginning the assembly of your J-3 Cub, remove each part from its bag for inspection. Closely inspect the fuselage, wing panels, rudder, and stabilizer and 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 covering iron to remove them. Use caution while working around areas where the colors overlap to prevent separating the colors.



**HAN100 – Heat Gun**

**HAN150 – Covering Glove**



**HAN101 – Covering Iron**

**HAN141 – Sealing Iron  
Sock**

## Warranty Information

---

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

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

Once assembly of the model has been started, you must contact Horizon Hobby, Inc. directly regarding any warranty question that you have. Please do not contact your local hobby store regarding warranty issues, even if that is where you purchased it. This will enable Horizon to better answer your questions and provide service in the event that you may need any assistance.

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

For any additional questions please contact:

Horizon Hobby Product Support  
4105 Fieldstone Road  
Champaign, Illinois 61822  
(877) 504-0233  
[www.horizonhobby.com](http://www.horizonhobby.com)

# Section 1: Hinge Installation

## Required Parts

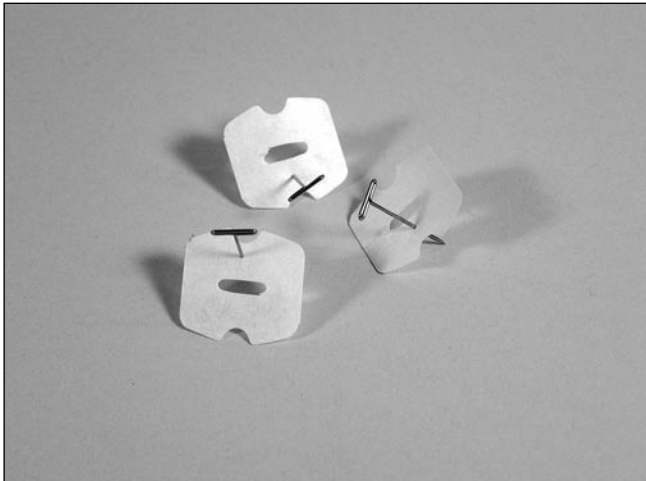
- Stabilizer
- Elevator
- Fuselage
- Rudder
- Wing
- Aileron (R&L)
- Tail gear wire
- Hinge (17)

## Required Tools and Adhesives

- Thin CA
- T-pins
- 6-minute epoxy
- Petroleum jelly
- Drill
- Drill bit: 1/16", 3/32"
- Hobby knife

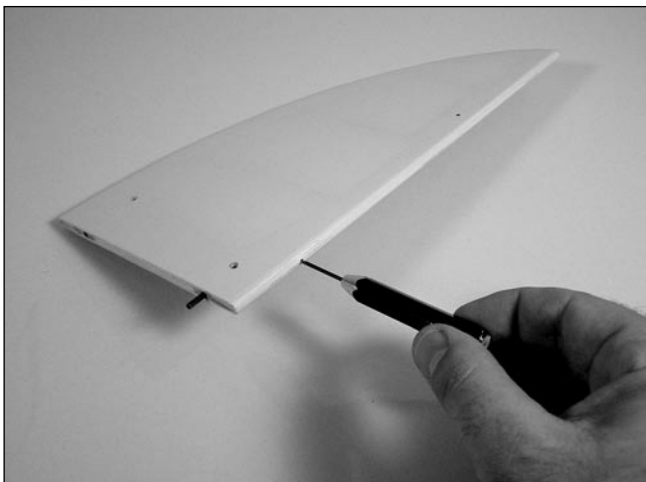
### □ □ Step 1

Locate three hinges. Place a T-pin in the center of each hinge.



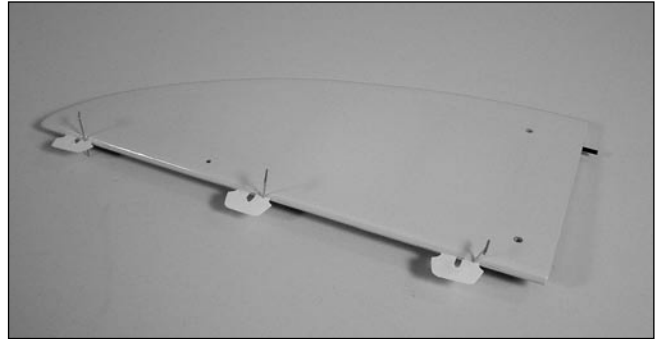
### □ □ Step 2

Drill a 1/16" hole in both a stabilizer and elevator half in the center of the hinge locations.



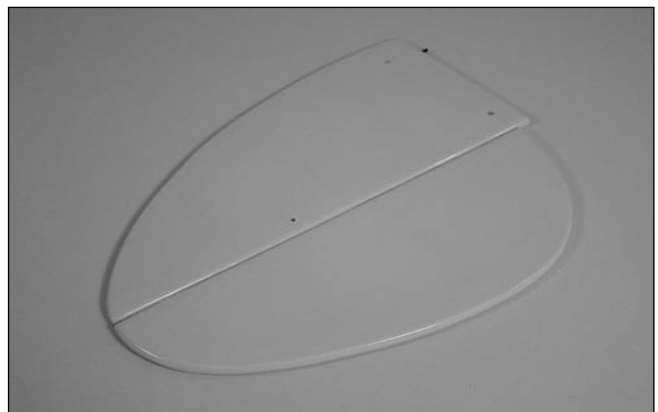
### □ □ Step 3

Place the hinges in the stabilizer.



### □ □ Step 4

Slide the elevator and stabilizer together. Remove the T-pins. There should be a 1/64" gap between the stabilizer and elevator.



### □ □ Step 5

Check that the tips of the stabilizer and elevator are aligned. Wick thin CA into each of the hinges.

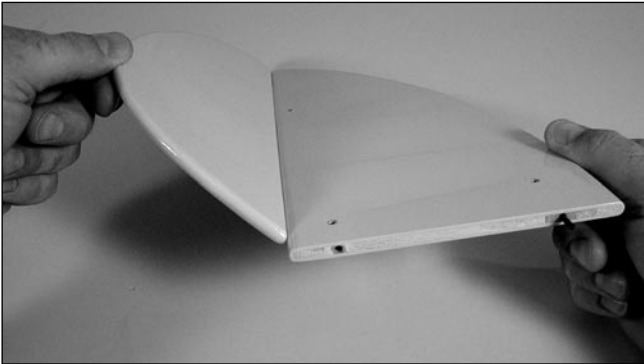


**Note:** Do not use accelerator in the hinging process. The CA must be allowed to soak into the hinge naturally.

## Section 1: Hinge Installation

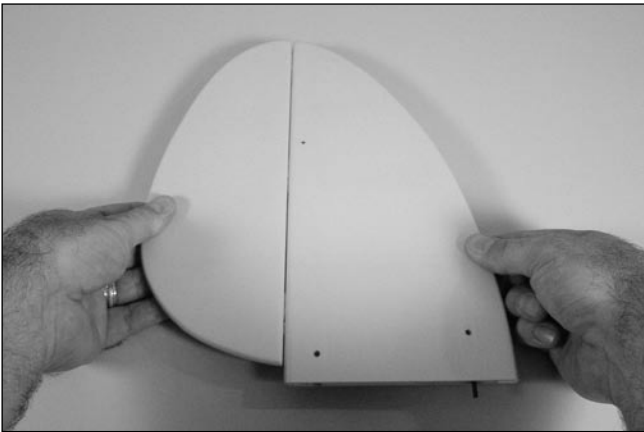
### □ □ Step 6

After the CA has cured, flex the surfaces several times to break in the hinges.



### □ □ Step 7

Pull on both surfaces to make sure the hinges are secure.



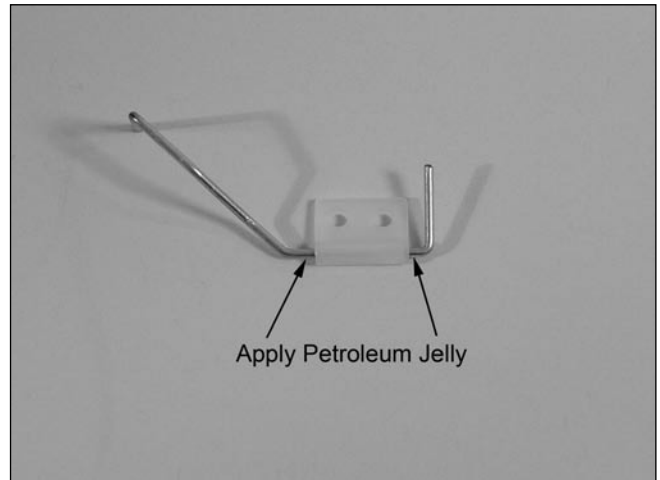
### □ Step 8

Repeat Steps 1 through 7 for the aileron hinges. Each aileron will use four hinges. Center the ailerons and make sure they are not binding before gluing the hinges.



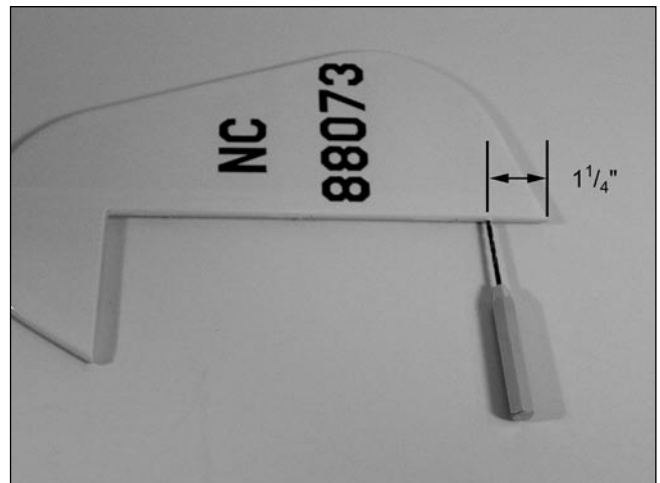
### □ Step 9

Coat the tail gear wire near the bushing with petroleum jelly. Work the lubricant into the bearing to prevent epoxy from entering the bearing, gluing the bearing to the wire.



### □ Step 10

Drill a 3/32" hole in the rudder 1 1/4" from the bottom.



## Section 1: Hinge Installation

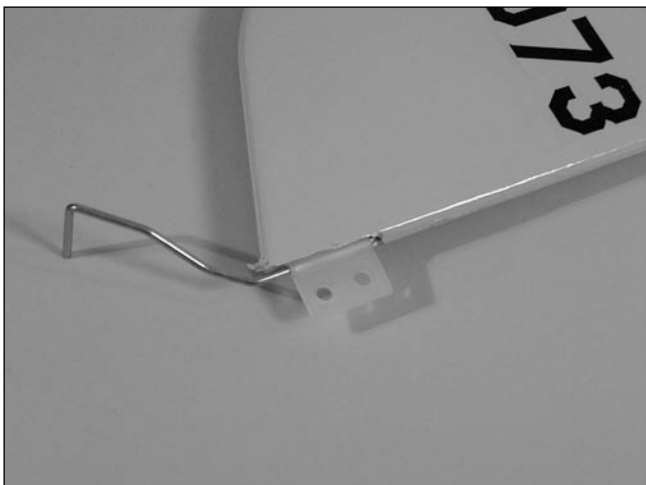
### ☐ Step 11

Cut a groove from the hole to the bottom of the rudder to allow clearance for the tail gear bearing.



### ☐ Step 12

Apply a thin layer of lubricant where the bearing will ride in the rudder. Use 6-minute epoxy to glue the wire into the rudder.



### ☐ Step 13

Cut a slot in the end of the fuselage to accept the tail gear bearing.



### ☐ Step 14

Install three hinges into the rudder. Test fit the rudder to the fuselage, sliding the hinges and tail wheel bracket into position.

### ☐ Step 15

Use 6-minute epoxy to glue the tail gear bearing into the fuselage. Use thin CA for the hinges.





## Section 2: Engine Installation

### Required Parts

- Fuselage assembly
- Engine mount
- 8-32 x 3/4" bolt (4)
- 8-32 lock nut (4)
- 14 1/4" pushrod wire
- Clevis retainer
- Engine mount plate (2)
- Fuel tank assembly
- 8-32 X 1" bolt (4)
- #8 washer (4)
- Clevis

### Required Tools and Adhesives

- Engine w/muffler
- Ruler
- Threadlock
- Phillips screwdriver

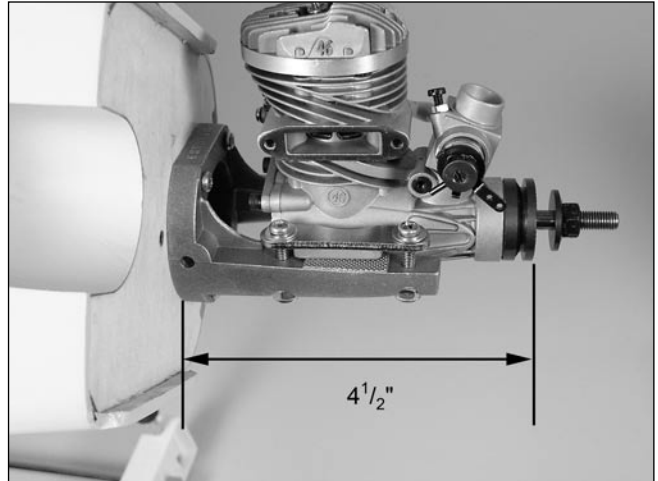
#### □ Step 1

Secure the engine mount to the firewall using four 8-32 x 3/4" bolts. Use threadlock to prevent the bolts from vibrating loose during flight.



#### □ Step 2

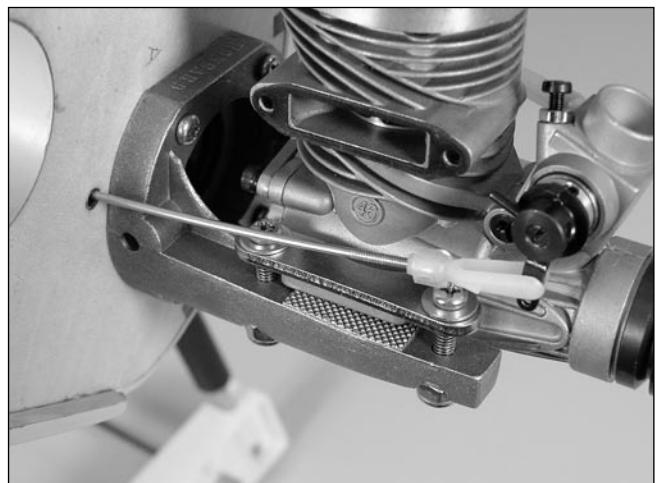
Position the engine so the drive washer is 4 1/2" forward of the firewall. Use the engine mount plates, 8-32 x 1" bolts, 8-32 lock nuts and #8 washers to attach the engine to the mount. The engine mounting lugs are sandwiched between the engine mount plates and the engine mount. Tighten the bolts evenly.



**Note:** The engine mount plates have texture on one side, which is placed against the engine mounting lugs.

#### □ Step 3

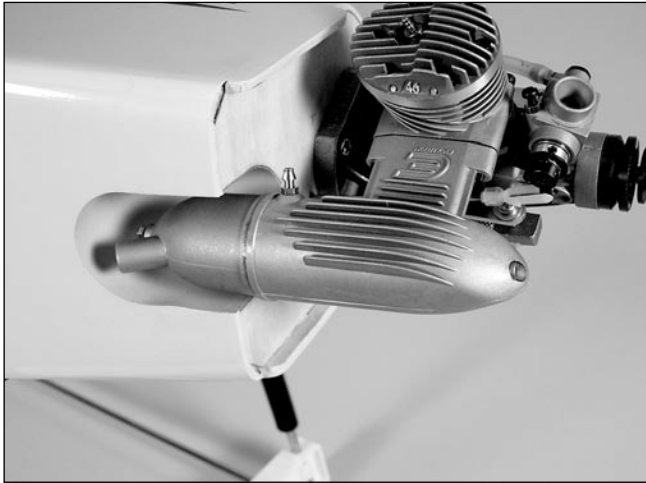
Place a clevis retainer onto a clevis. Thread the clevis onto the 14 1/4" pushrod wire. Slide the wire into the pushrod tube in the fuselage. Attach the clevis to the carburetor arm.



## Section 2: Engine Installation

### ☐ Step 4

Attach the muffler to the engine using the hardware provided with your particular engine.



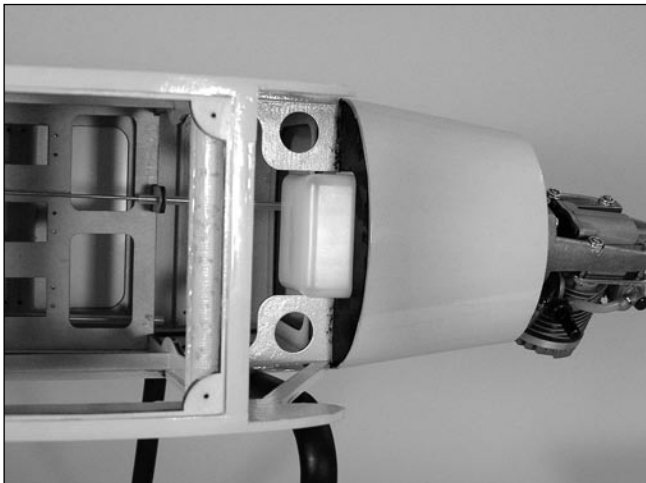
**Note:** It may be necessary to rotate the end of the muffler to point the stinger straight down, away from the fuselage.

### ☐ Step 5

Check the tank and note which fuel line is vent and which is attached to the clunk. Make a note of the line colors and which they correspond to. Also note the direction of the vent line inside the fuel tank so it faces toward the top of the fuselage.

### ☐ Step 6

With the vent line up, slide the fuel tank into the fuselage.



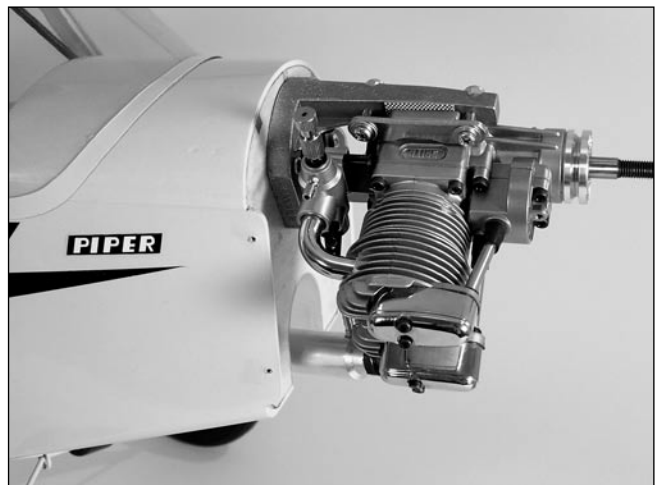
### ☐ Step 7

Attach the vent line to the muffler and the line from the clunk to the carburetor.



### ☐ Step 8

A Saito™ 4-stroke can be installed instead of a 2-stroke engine. You will have to relocate the throttle pushrod to line up with the throttle arm on the carburetor.



## Section 3: Servo Installation (Aileron)

### Required Parts

- Wing (L&R)
- #2 x 3/8" screw (8)
- 2mm x 20mm screw (6)
- Clevis retainer (2)
- 4 3/4" pushrod wire (2)
- Pushrod wire keeper (2)
- Servo hatch (L&R)
- Control horn (2)
- Clevis (2)

### Required Tools and Adhesives

- Phillips screwdriver (small)
- Felt-tipped pen
- Drill
- Pliers
- 12" servo extension (2)
- Long Servo Arm (JRPA212) (2)
- 6-minute epoxy
- String
- Drill bit: 1/16", 3/32"
- "Y" harness
- Hobby knife

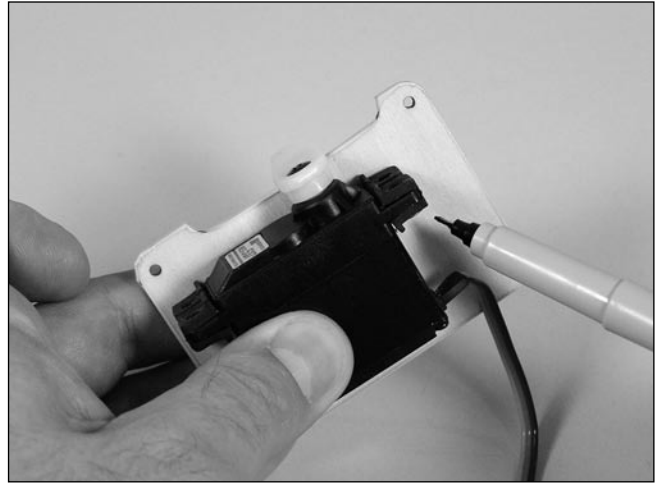
#### □ Step 1

Remove the covering from the servo opening in the bottom of the wing using a hobby knife. Select the correct servo hatch by checking the alignment for the servo arm on the plate with the one on the wing.



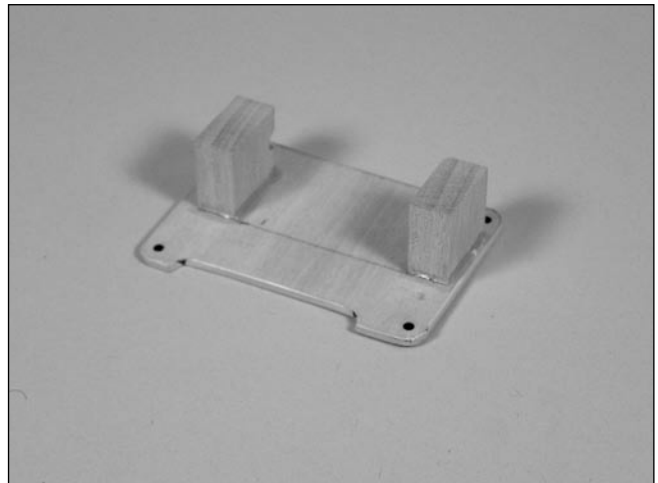
#### □ Step 2

Install the recommended servo hardware (grommets and eyelets) supplied with the servo. Temporarily install a long half servo arm (JRPA212) onto the servo and position the servo onto the hatch so the servo arm is centered in the notch. Once satisfied, mark the location for the servo mounting blocks using a felt-tipped pen.



#### □ Step 3

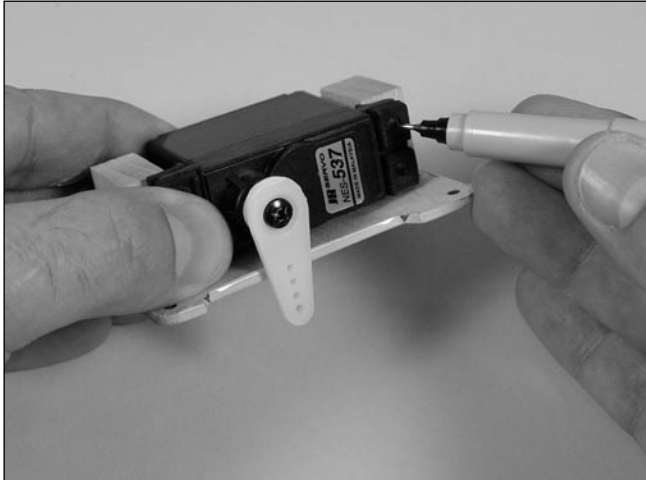
Locate the 3/8" x 3/4" x 3/4" servo mounting blocks. Use 6-minute epoxy to glue the blocks to the hatch. Let the epoxy fully cure before proceeding to the next step.



## Section 3: Servo Installation (Aileron)

### □ Step 4

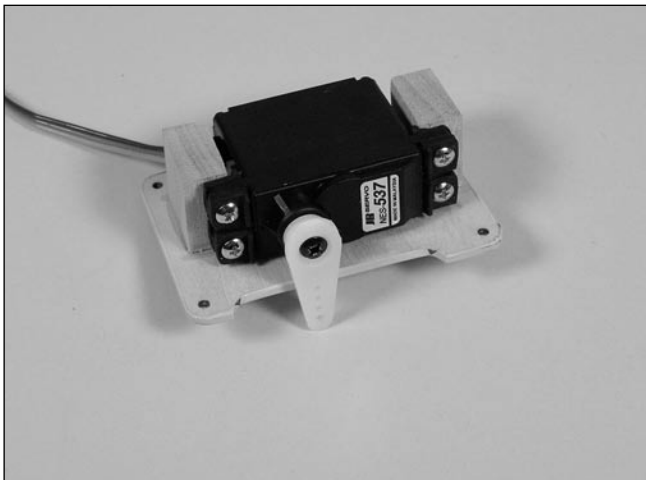
Place the aileron servo between the mounting blocks and use a felt-tipped pen to mark the location of the four servo mounting screws. Note that the servo must not touch the hatch in order to isolate engine vibration.



**Note:** Before mounting the servo, electronically center the servo using the transmitter, then install the servo arm to avoid having to remove the servo and center the arm later. It may be necessary to slightly trim one of the servo mounting blocks to clear the servo wire.

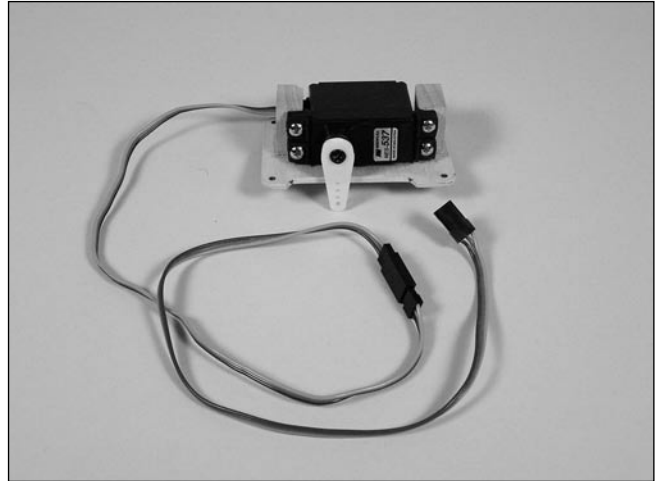
### □ Step 5

Remove the servo and use a 1/16" drill bit to pre-drill the holes for the servo mounting screws marked in the previous step. Use the screws supplied with the servo to mount it to the servo mounting blocks.



### □ Step 6

Connect a 12" Servo Lead Extension (JRPA098) to the servo lead. Secure the connectors by tying them in a knot using dental floss or by using a commercially available connector clamp to prevent the servo leads from becoming disconnected.

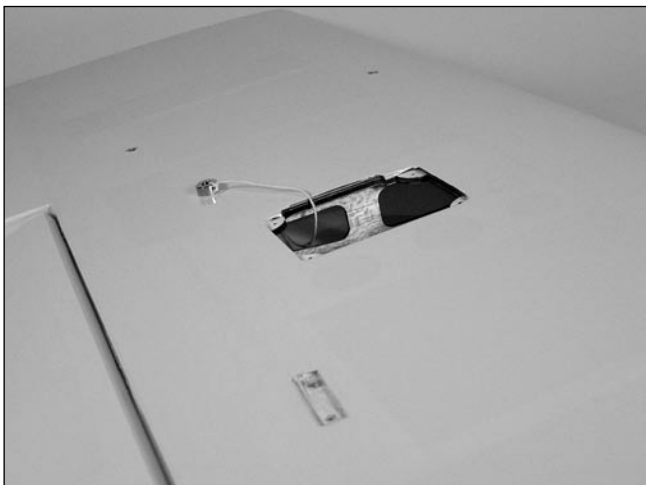
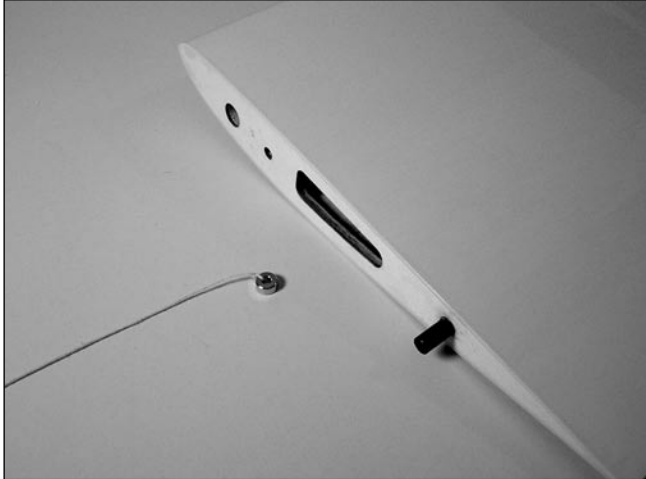


**Note:** It is always a good idea to secure the servo connector and servo extension together to prevent the wires from becoming unplugged.

### Section 3: Servo Installation (Aileron)

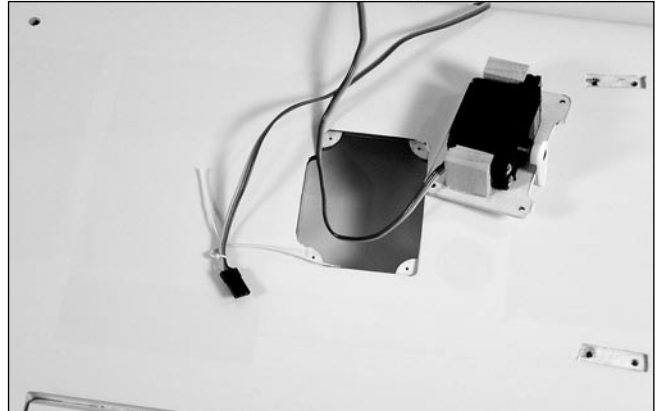
#### □ Step 7

Tie a wheel collar onto a piece of string. Drop the wheel collar into the wing from the root and retrieve it from the servo opening.



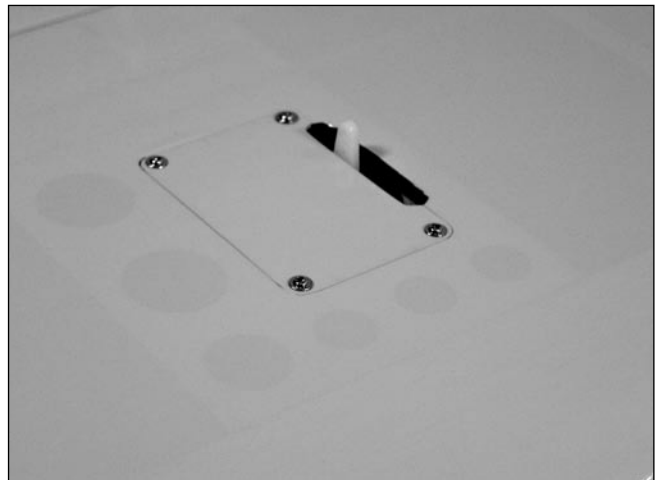
#### □ Step 8

Tie the string onto the servo extension. Gently pull the extension through the wing using the string. Untie the string when the servo lead has been pulled through. Use tape to secure the servo lead to the wing to prevent it from falling back into the wing panel.



#### □ Step 9

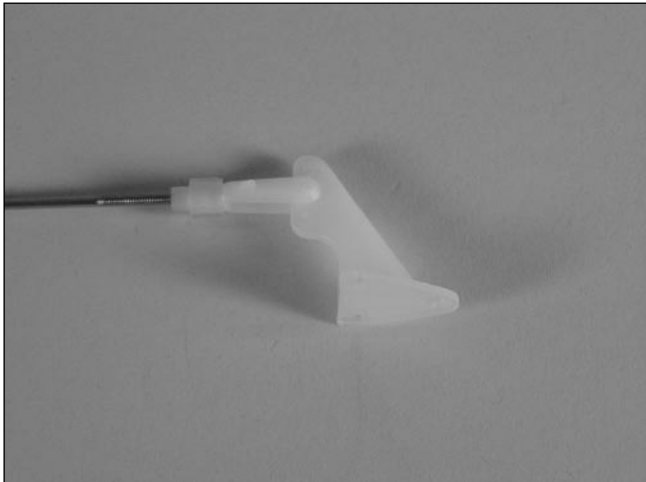
Secure the hatch using four #2 x 3/8" screws.



## Section 3: Servo Installation (Aileron)

### □ Step 10

Place a clevis retainer onto a clevis. Thread the clevis onto a  $4\frac{3}{4}$ " pushrod wire. Remove the backplate from a control horn, and then attach the clevis to the control horn.



### □ Step 11

Position the control horn on the aileron. Use the pushrod wire as a guide to align the horn to the servo arm. Position the horn so the holes align with the hinge line. Use a felt-tipped pen to mark the positions for the three mounting bolts.



### □ Step 12

Drill the locations marked in the previous step using a  $\frac{3}{32}$ " drill bit.



### □ Step 13

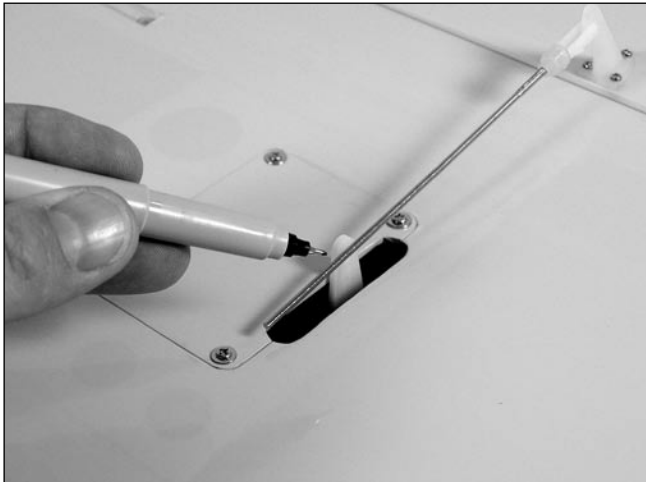
Place a few drops of thin CA into each of the holes to harden the balsa. Attach the control horn using three 2mm x 20mm screws and the control horn backplate.



## Section 3: Servo Installation (Aileron)

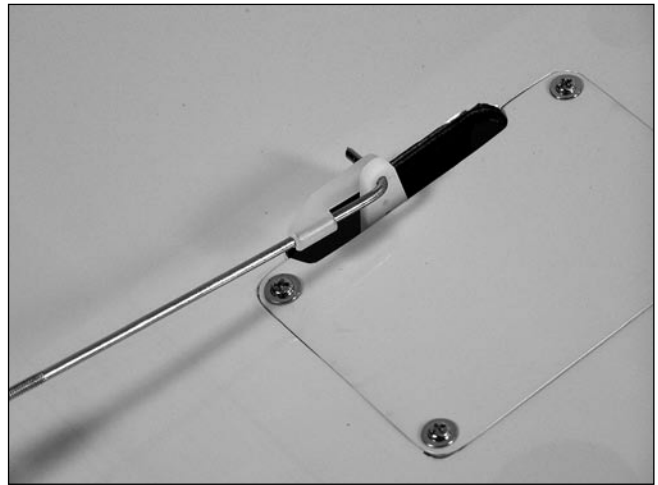
### □ Step 14

Plug in the aileron servo to the radio system. Center the trims on the transmitter to center the aileron servo. Hold the aileron in neutral. Use a felt-tipped pen to mark the pushrod wire where it crosses the servo arm.



### □ Step 15

Bend the pushrod wire at the mark. Use a pushrod wire keeper to secure the pushrod wire to the servo arm.



### □ Step 16

Repeat Steps 1 through 15 for the remaining wing panel.

## Section 4: Servo Installation (Fuselage)

### Required Parts

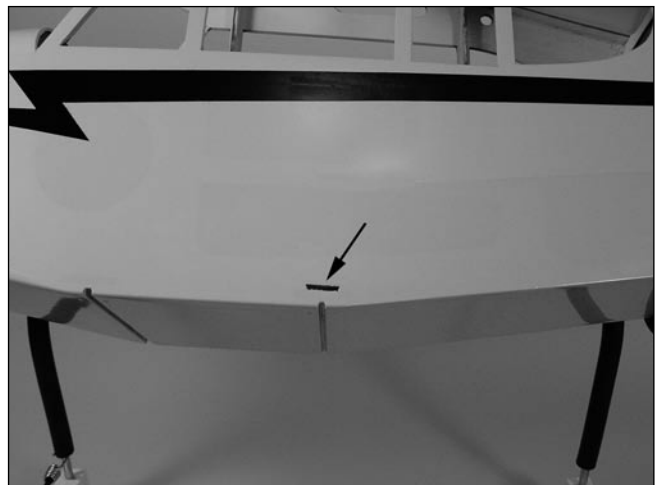
- Fuselage
- Clevis
- Clevis retainer
- Control horn
- Wing strut mount (2)
- #4 x 3/8" screw (4)
- 19<sup>3</sup>/<sub>4</sub>" pushrod dowel
- 6" pushrod wire
- Pushrod wire (32")
- 2<sup>1</sup>/<sub>8</sub>" heat shrink tubing (2)
- 2mm x 12mm screw (3)
- 7<sup>1</sup>/<sub>4</sub>" pushrod wire (2)

### Required Tools and Adhesives

- Phillips screwdriver
- Hobby knife
- Drill
- Drill bit: 3/32", 5/64"
- Heat gun
- Medium CA
- Thin CA
- Felt-tipped pen

### □ Step 1

Remove the covering for the wing strut mount. The opening is located above the rear landing gear mount.



## Section 4: Servo Installation (Fuselage)

### □ Step 2

Slide the wing strut mount into the opening. Secure the mount using two #4 x 3/8" screws.

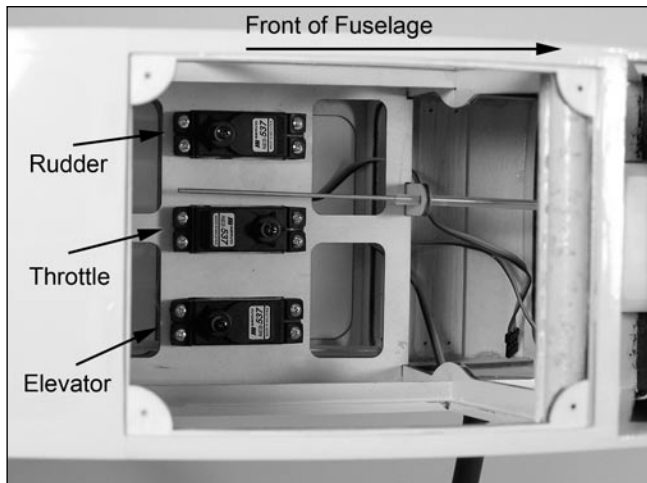


### □ Step 3

Install the recommended servo hardware (grommets and eyelets) supplied with the servos into the throttle, rudder, and elevator servos.

### □ Step 4

Use the hardware provided with the servos to mount them in the fuselage.



### □ Step 5

Place a clevis retainer onto a clevis. Thread the clevis onto a 32" pushrod wire. Remove the backplate from a control horn, and then attach the clevis to the control horn. Slide the pushrod into the rudder pushrod tube in the fuselage. Position the horn so the holes align with the hinge line. Use a felt-tipped pen to mark the positions for the three mounting bolts.



### □ Step 6

Drill the locations marked in the previous step using a 3/32" drill bit. Place a few drops of thin CA into each of the holes to harden the balsa. Attach the control horn using three 2mm x 12mm screws and the control horn backplate.





## Section 4: Servo Installation (Fuselage)

### □ Step 7

Plug in the rudder servo to the radio system. Center the trims on the transmitter to center the rudder servo. Hold the rudder in neutral. Use a felt-tipped pen to mark the pushrod wire where it crosses the servo arm.



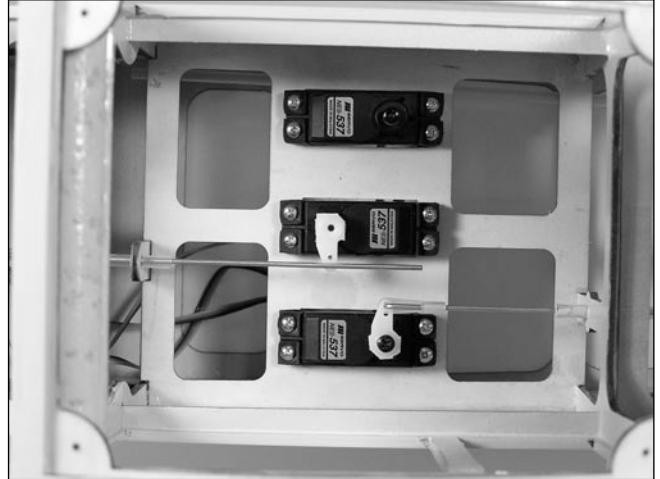
### □ Step 8

Remove the pushrod wire from the fuselage and remove the clevis. Bend the pushrod wire at the mark. Slide the pushrod back into the fuselage from the radio compartment, and then put the clevis back onto the wire. Use a pushrod wire keeper to secure the pushrod wire to the servo arm.



### □ Step 9

Center the throttle stick and trim with both the receiver and transmitter on. Install the throttle servo arm in the neutral position.



### □ Step 10

Move the throttle stick and trim lever down to the throttle closed position. Manually close the carburetor and mark the throttle pushrod where it crosses the servo arm.



## Section 4: Servo Installation (Fuselage)

### □ Step 11

Remove the pushrod wire from the fuselage and remove the clevis. Bend the pushrod wire at the mark. Slide the pushrod back into the fuselage from the radio compartment, and then put the clevis back onto the wire. Use a pushrod wire keeper to secure the pushrod wire to the servo arm.

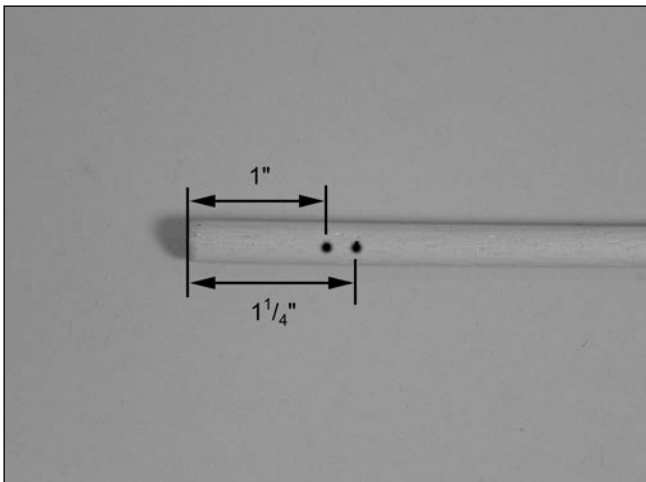


### □ Step 12

Check the movement of the throttle to verify there is no binding at either low or high throttle. If there is, make the necessary adjustment to eliminate any binding. Install the throttle servo arm screw when complete.

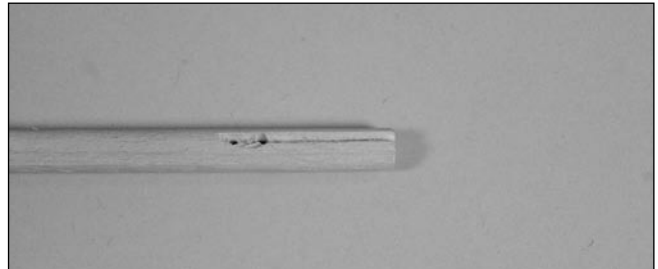
### □ Step 13

Locate the  $19\frac{3}{4}$ " wood pushrod for the elevator. Drill two  $\frac{5}{64}$ " holes through the dowel, 1" and  $1\frac{1}{4}$ ", from one end. The holes must be parallel to each other.



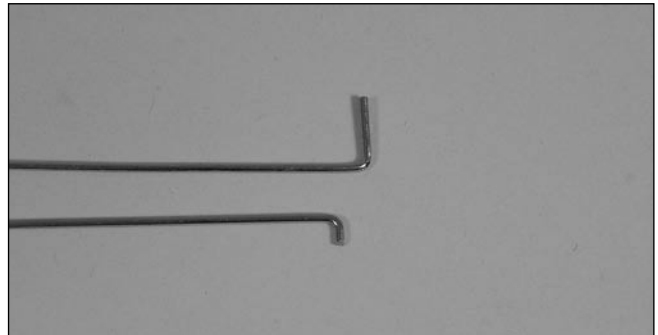
### □ Step 14

Cut a groove into the pushrod from the hole to the end of the pushrod. Repeat for the opposite side so you end up with two grooves. The elevator pushrod wires will rest in these grooves.



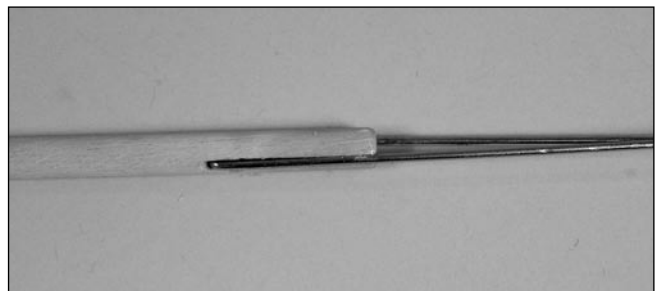
### □ Step 15

Locate the two  $7\frac{1}{4}$ " pushrod wires. Make a bend in one wire  $\frac{1}{4}$ " from the non-threaded end of one of the wires. The remaining pushrod is bent  $\frac{1}{2}$ " from the end.



### □ Step 16

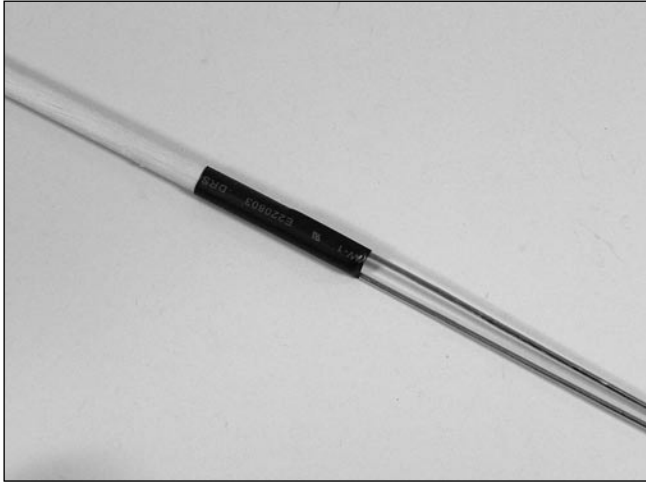
Test fit the two wires. The wire bent at  $\frac{1}{2}$ " is placed in the hole closest to the pushrod end. You will have to trim the wire down after the bend so it won't interfere with the other pushrod. Once fit, use medium CA to glue the wires to the dowel.



## Section 4: Servo Installation (Fuselage)

### □ Step 17

Slide the  $2\frac{1}{8}$ " piece of heat shrink over the wires and dowel. Use a heat gun or lighter to shrink the tubing. Once the tubing has been shrunk, apply thin CA to each end of the shrink to complete this part of the pushrod assembly.

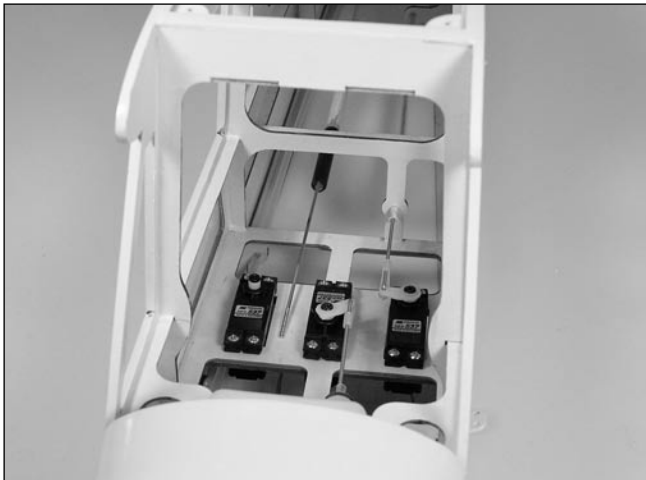


### □ Step 18

Repeat Steps 13 through 17 for the opposite end of the dowel, but only drill one hole and prepare one 6" pushrod wire.

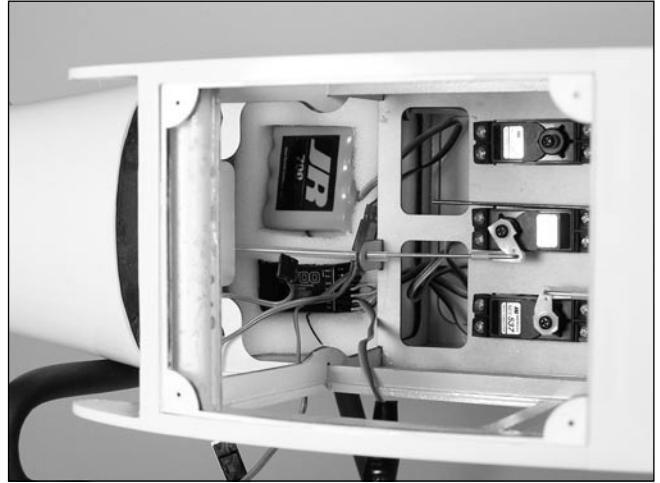
### □ Step 19

Slide the elevator pushrod wire in position into the fuselage. It may take some time to get it in, so be patient. Slide a clevis retainer onto two clevises, and then thread them onto the pushrod wires at the aft end of the fuselage. This will prevent the pushrod wire from falling out of the fuselage.



### □ Step 20

Plug the necessary servo leads into the receiver. This includes the switch harness and battery leads as well. Install the flat radio foam into the fuselage, followed by the die-cut foam. Place the receiver and battery into the foam.



**Note:** There is a tube located under the elevator servo for the antenna wire. Route the wire through this tube to the tail of the aircraft.

### □ Step 21

Place the remaining flat radio foam over the receiver and battery. Secure the foam to prevent the receiver and battery from moving from their location. Mount the receiver switch to the side of the fuselage.



# Section 5: Window Installation

## Required Parts

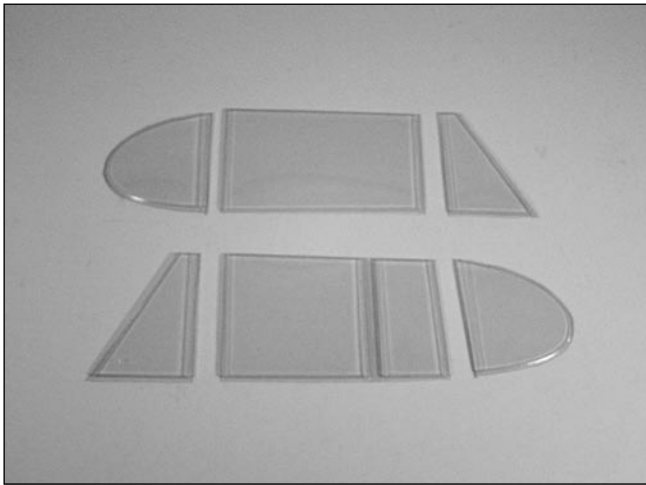
- Side window (L&R)
- Front windscreen
- Support (2)
- Fuselage hatch

## Required Tools and Adhesives

- Hobby scissors
- Canopy glue
- Hobby knife

### ☐ Step 1

Use hobby scissors and a hobby knife to trim the side windows from their sheets. Leave a 1/8" lip to glue the windows to the fuselage.



### ☐ Step 2

Test fit the windows from the inside of the fuselage. Trim them as necessary so they fit flush to the outside of the fuselage. Use canopy glue to secure the windows into the fuselage. Install the window into the fuselage hatch at this time as well.

**Note:** You can use epoxy as well, but be very careful not to get epoxy on the nice clear windows.

### ☐ Step 3

Cut and fit the two supports to the fuselage. Use medium CA to glue them into position.



### ☐ Step 4

Test fit the front windscreen into position. Trim as necessary. Use canopy glue to secure the front windscreen to the fuselage.



## Section 6: Landing Gear Installation

### Required Parts

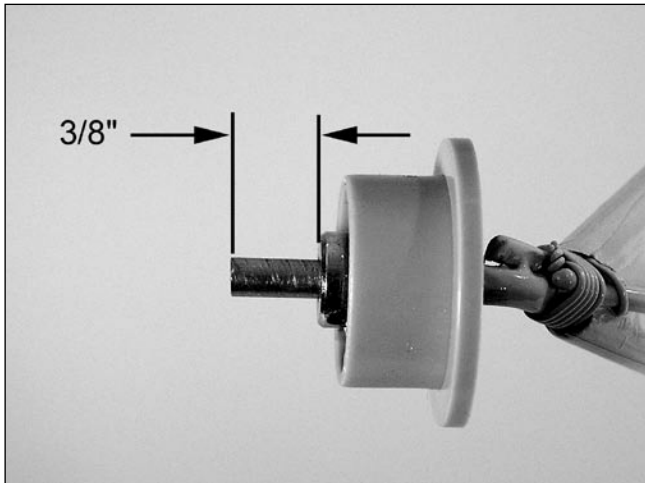
- Landing gear
- 3.35" (85mm) wheel (2)
- Inner wheel hub (2)
- 1" (25mm) wheel
- 2mm x 14mm screw (8)
- Large wheel collar w/setscrew (4)
- 3mm x 10mm screw (8)
- Small wheel collar w/setscrew
- Wheel cap (2)
- Outer wheel hub (2)
- Landing gear strap (4)

### Required Tools and Adhesives

- Phillips screwdriver (small)
- Hex wrench
- Hobby knife
- Sandpaper

#### □ □ Step 1

Use a hobby knife to scrape away the paint on the landing gear where the wheel will be located. Slide the inner wheel hub onto the axle. Next, slide a large wheel collar 3/8" from the end of the axle and secure it using the setscrew.



#### □ □ Step 2

Position the 3.35" (85mm) wheel onto the inner hub. Attach the outer wheel hub to the inner wheel hub using four 2mm x 14mm screws. The screws go through the outer wheel hub and into the inner wheel hub.



#### □ □ Step 3

Snap the wheel cap onto the wheel.



#### □ Step 4

Repeat Steps 1 through 3 for the remaining wheel.

## Section 6: Landing Gear Installation

### ☐ Step 5

Position the landing gear to the bottom of the fuselage. Secure the position of the gear using four landing gear straps and eight 3mm x 10mm screws.



### ☐ Step 6

Secure the tail wheel using the small wheel collar and setscrew.



# Section 7: Installing the Stabilizer

## Required Parts

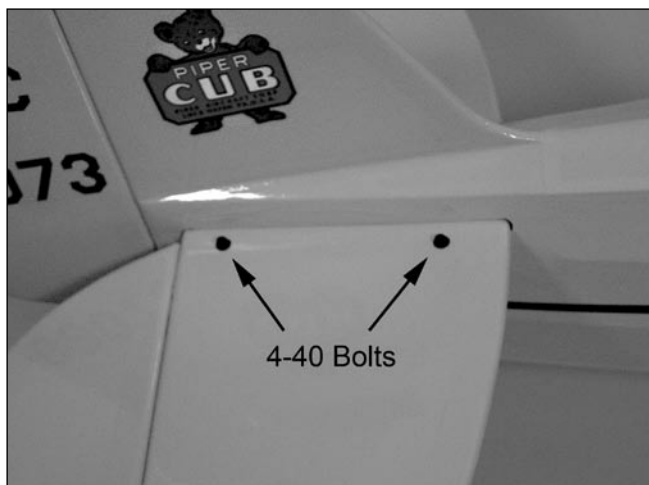
- Stabilizer assembly
- #4 washer (4)
- 2-56 x 1/2" screw (3)
- Clevis (4)
- Cable ends (4)
- Cable
- Control horn (2)
- 2mm x 12mm screw (6)
- Brass fitting (small) (6)
- Brass fitting (large) (2)
- #2 x 1/2" sheet metal screw
- 4-40 x 1/2" socket head screw (4)
- Fuselage
- #2 washer (3)
- 2-56 nut (3)
- Clevis retainer (4)
- Brass crimps (8)
- Pushrod wire keeper

## Required Tools and Adhesives

- Threadlock
- Drill
- Adjustable wrench
- Phillips screwdriver (small)
- Pliers
- Drill bit: 3/32"
- Crimping tool

### □ Step 1

Slide the stabilizer halves into the slot in the fuselage. Use four 4-40 x 1/2" screws and four #4 washers to secure the stabilizer. Use threadlock to prevent the screws from vibrating loose during flight.



### □ Step 2

Attach a control horn to one of the elevator clevises. Line the holes in the control horn with the hinge line and mark the location for the mounting crews onto the elevator.



### □ Step 3

Drill the holes using a 3/32" drill bit. Use thin CA to harden the holes. Mount the control horn using the horn backplate and three 2mm x 12mm screws.



## Section 7: Installing the Stabilizer

### ☐ Step 4

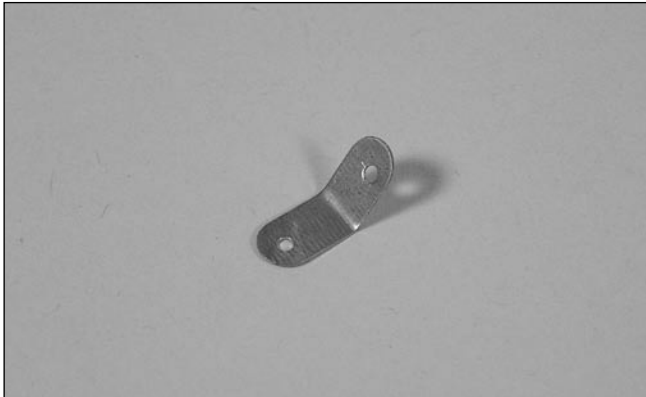
Repeat Steps 2 and 3 for the remaining elevator control horn.

### ☐ Step 5

Attach the elevator pushrod to the servo arm of the elevator servo using a pushrod wire keeper.

### ☐ Step 6

Bend each of the fittings (small and large) to about a 45-degree angle.



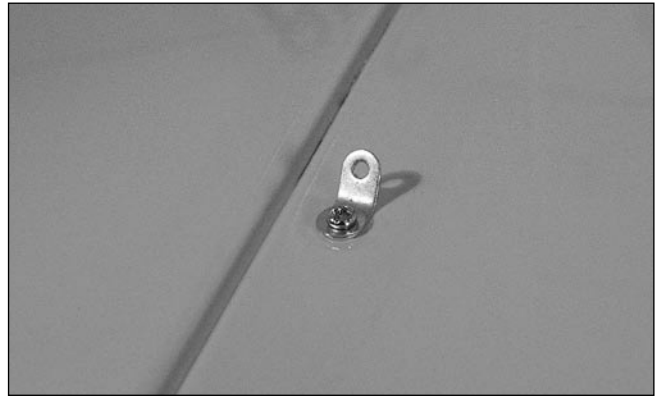
### ☐ Step 7

Attach the large brass fittings at the bottom rear of the fuselage using the #2 x 1/2" sheet metal screw.



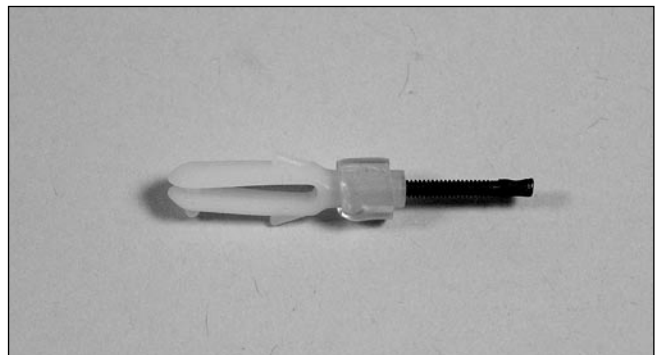
### ☐ Step 8

Attach the small brass fitting to the fin and stabilizer using 2-56 x 1/2" screws, #2 washers and 2-56 nuts. Fittings are placed on both sides of the rudder and the top and bottom of the stabilizer.



### ☐ Step 9

Slide a clevis retainer onto a clevis. Thread a cable end into the clevis. Prepare four of these connectors.

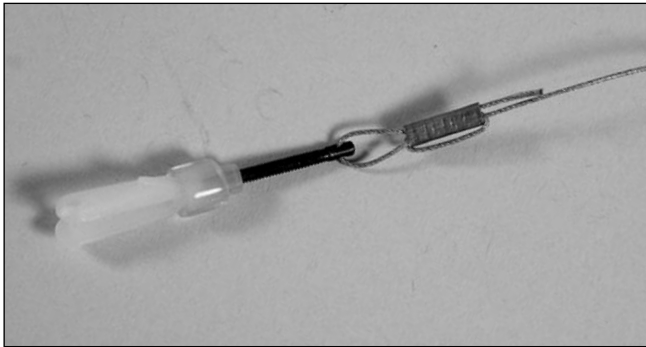
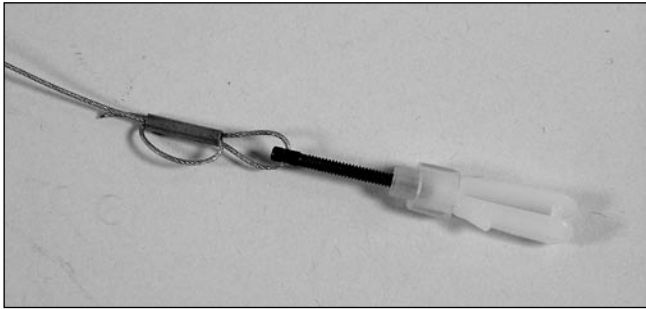
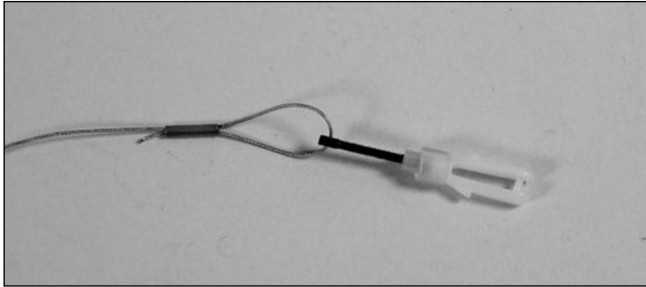




## Section 7: Installing the Stabilizer

### □ □ Step 10

Cut the cable into four equal pieces. Prepare one cable by sliding the cable through a crimp, through the cable end, then back through the crimp twice. Pull the excess cable tight and use a crimping tool to complete the job. Repeat for all four of the ends.



### □ Step 11

Attach the four connectors to the brass fittings of the stabilizer.



### □ Step 12

Repeat Step 10, only passing the cable through the brass fittings instead of the cable ends. The cables should have very light tension.



# Section 8: Cowling Installation

## Required Parts

- Fuselage
- Propeller
- #2 x 3/8" sheet metal screw (4)

## Required Tools and Adhesives

- Phillips screwdriver (small)
- Ruler
- Drill
- Drill bit: 1/16", 5/64"
- Hobby scissors
- Felt-tipped pen
- Rotary tool w/sanding drum

### □ Step 1

Remove the propeller nut and washer from the engine. Position the drive washer so it is keyed onto the engine shaft. Slide the spinner backplate onto the engine shaft, and then slide the propeller into position.

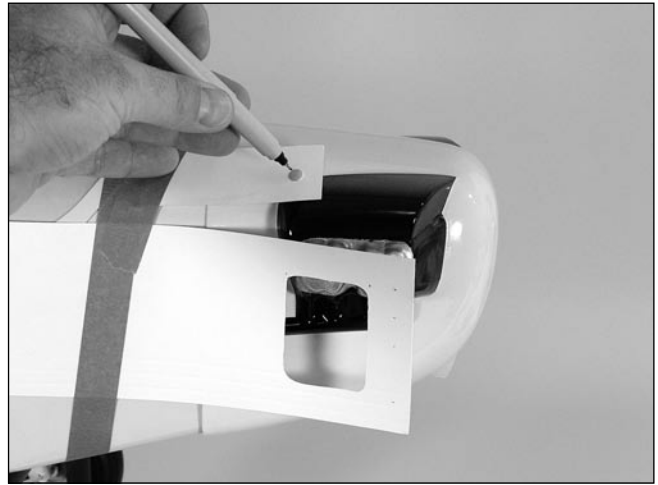
### □ Step 2

Use card stock taped to the fuselage to indicate the locations for the needle valve, cylinder head, muffler, and any other items that will extend outside the cowling.



### □ Step 3

Remove the engine and slide the cowling onto the fuselage. Position it so the opening for the crankshaft is 4 1/8" forward of the firewall. Transfer the locations from the card stock onto the cowling using a felt-tipped pen.



### □ Step 4

Carefully trim the cowling to fit over the engine. Work slowly and remove small amounts of material at a time. Use card stock to indicate the sides of the fuselage. Slide the cowl in position, allowing the drive washer to extend 1/8" forward of the cowl, then mark the positions for the cowling screws.



## Section 8: Cowling Installation

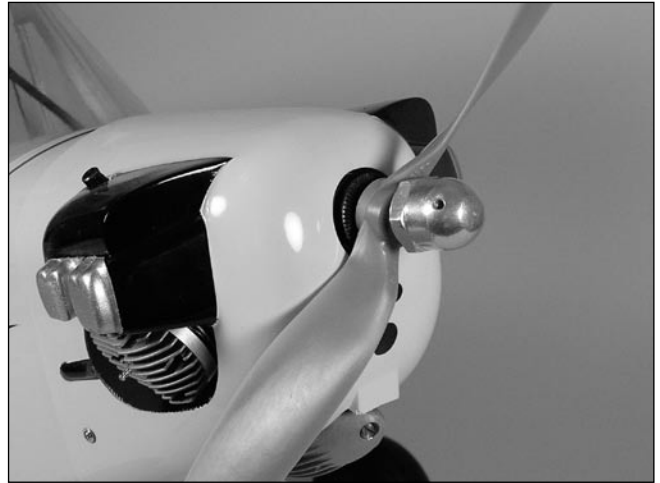
### ☐ Step 5

Drill 1/16" holes through the cowl and into the fuselage sides at the locations marked in the last step. Enlarge the holes in the cowl using a 5/64" drill bit. Secure the cowl to the fuselage using four #2 x 3/8" screws.



### ☐ Step 6

Attach the propeller following the instructions provided with your particular engine.



# Section 9: Wing Installation

## Required Parts

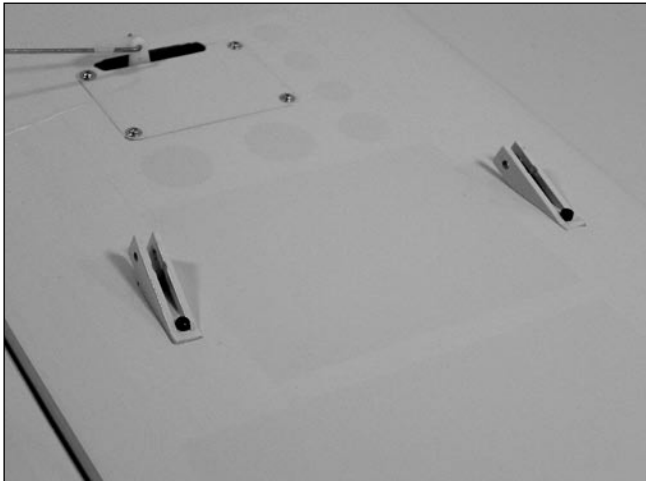
- Wing
- 4-40 lock nut (16)
- Strut support anchor (4)
- Strut end (4)
- Strut (wide) (L&R)
- Strut brace (short) (2)
- #2 x 3/8" screw (4)
- 1/4-20 x 2" nylon bolt (2)
- 4-40 x 1/2" socket head screw (24)
- Fuselage
- 4-40 nut (4)
- Strut bracket (4)
- Strut (narrow) (L&R)
- Strut brace (long) 2
- Strut cross brace (2)
- Fuselage hatch

## Required Tools and Adhesives

- Hex wrench
- Threadlock
- Phillips screwdriver (small)
- Adjustable wrench

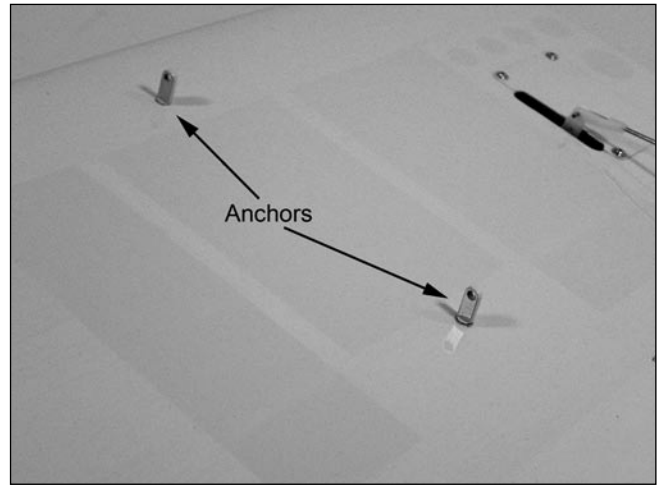
### □ □ Step 1

Attach two strut brackets to the bottom of the wing using four 4-40 x 1/2" socket head screws. Use threadlock to prevent the screws from loosening during flight.



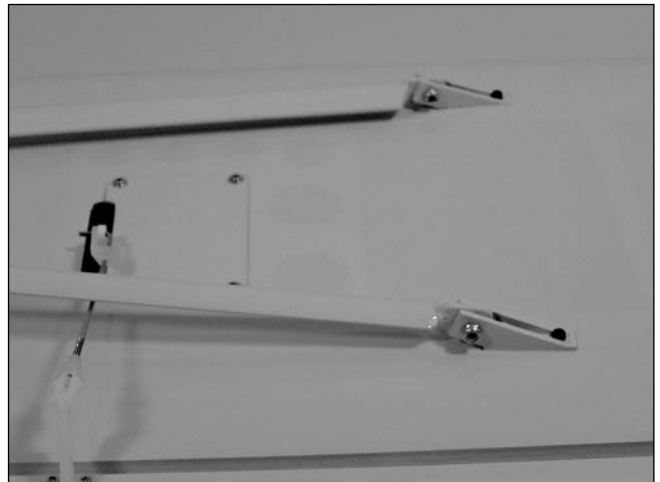
### □ □ Step 2

Thread the strut support anchors into the holes in the wing. The anchors have external threads.



### □ □ Step 3

Attach the strut to the strut brackets using two 4-40 x 1/2" socket head screws and two 4-40 lock nuts. The wide strut goes towards the leading edge, the narrow strut towards the trailing edge.



**Note:** The airfoil of the struts matches the direction of the wing. The struts also have fittings in the center, which will face towards the wing when installed.

## Section 9: Wing Installation

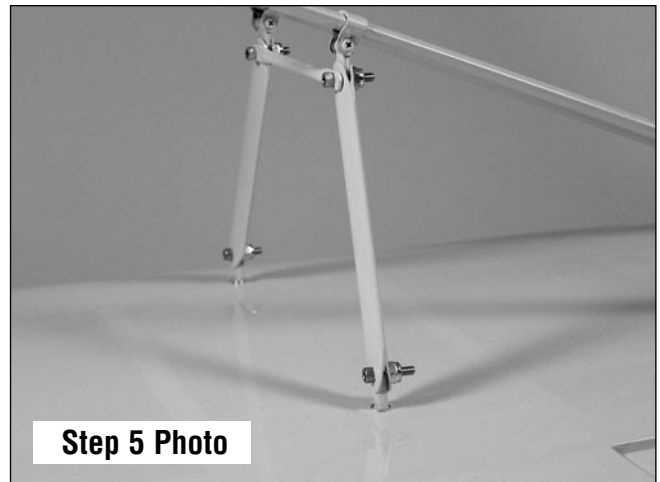
### □ □ Step 4

Thread a 4-40 nut onto the threaded end of the strut. Thread a strut end onto the strut. The nut will be used once the strut has been adjusted.



### □ □ Step 5

Install the short strut brace to the rear strut support anchor and the long strut brace to the front strut support anchor using 4-40 x 1/2" socket head screws and 4-40 nuts. Attach the strut supports and the strut cross brace using two 4-40 x 1/2" socket head screws and two 4-40 lock nuts.



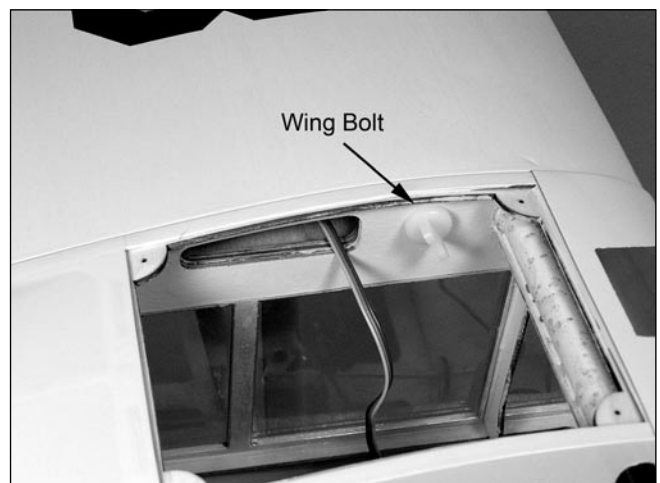
### □ □ Step 6

Slide the wing tube into the wing panel. Slide the tube and panel into position on the fuselage.



### □ □ Step 7

Secure the wing panel using a 1/4-20 x 2" nylon bolt.



## Section 9: Wing Installation

### ☐ ☐ Step 8

Support the fuselage so the wing is not resting on the work surface. Adjust the strut end so it aligns with the wing strut mount. Attach the wing struts using two 4-40 x 1/2" socket head bolts and two 4-40 locking nuts. Once attached, tighten the 4-40 nuts on the strut to prevent the end from rotating when the wing is removed for storage.



### ☐ Step 9

Repeat Steps 1 through 8 to install the remaining wing panel and strut.

### ☐ Step 10

Install the fuselage hatch using four #2 x 3/8" screws.



**Note:** When removing the wing, simply disconnect the bolts holding the strut to the fuselage. This will make things much easier when installing the wing at the field.

**Note:** The struts on the J-3 Cub are functional, so be sure all bolts and nuts are tight before flying. Failure to do so could result in wing failure.

# Adjusting the Engine

☐ **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.

# 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.

**Elevator**

Low Rate	11/16" (11.5°) Up	9/16" (10°) Down
High Rate	1 1/4" (19.5°) Up	1" (18°) Down

Linear measurement (Inches) measured at widest part of elevator (roughly in the center).

**Note:** Use the Low Rate for most flying. The High Rate is used specifically for performing spin maneuvers.

**Aileron**

Low Rate	3/8" (8°) Up	1/2" (9°) Down
High Rate	7/8" (21°) Up	1 1/16" (22°) Down

Linear measurement (inches) measured at root.

**Rudder**

1 1/2" (28°) Left	1 1/2" (28°) Right
-------------------	--------------------

Linear measurement (inches) measured at front of counterbalance.

# Recommended 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) range for the Piper J-3 Cub is  $3\frac{1}{4}$ " (82.5mm) behind the leading edge of the wing against the fuselage. It is suggested to start at the forward end of the range until comfortable with the flight characteristics of your aircraft. 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 shop and work well for this purpose.

## Preflight

---

### Range Test Your Radio

#### ☐ Step 1

Before going to the field, be sure that your batteries are fully charged, per the instructions included with your radio. 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.

#### ☐ Step 2

Before each flying session, be sure to range check your radio. See your radio manual for the recommended range and instructions for your radio system. Each radio manufacturer specifies different procedures for their radio systems. Next, start the engine. With the model securely anchored, check the range again. The range test should not be significantly affected. If it is, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

**Note:** Keep loose items that can get entangled in the propeller away from the prop. These included loose clothing, or other objects such as pencils and screwdrivers. Especially keep your hands away from the propeller.

#### ☐ Step 3

Double-check that all controls (aileron, elevator, rudder and throttle) move in the correct direction.

#### ☐ Step 4

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.



# Range Testing the Radio

---

Before each flying session, range-check your radio. 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.

# 2005 Official AMA

## National Model Aircraft Safety Code

### 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 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.
- 4) The maximum takeoff weight of a model is 55 pounds, except models flown under Experimental Aircraft rules.
- 5) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. (This does not apply to models while being flown indoors.)
- 6) I will not operate models with metal-bladed propellers or with gaseous boosts, in which gases other than air enter their internal combustion engine(s); nor will I operate models with extremely hazardous fuels such as those containing tetranitromethane or hydrazine.

- 7) I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind) including, but not limited to, rockets, explosive bombs dropped from models, smoke bombs, all explosive gases (such as hydrogen-filled balloons), or ground mounted devices launching a projectile. The only exceptions permitted are rockets flown in accordance with the National Model Rocketry Safety Code or those permanently attached (as per JATO use); also those items authorized for Air Show Team use as defined by AST Advisory Committee (document available from AMA HQ). In any case, models using rocket motors as a primary means of propulsion are limited to a maximum weight of 3.3 pounds and a G series motor. (A model aircraft is defined as an aircraft with or without engine, not able to carry a human being.)
- 8) I will not consume alcoholic beverages prior to, nor during, participation in any model operations.
- 9) Children under 6 years old are only allowed on the flight line as a pilot or while receiving flight instruction.

### RADIO CONTROL

- 1) I will have completed a successful radio equipment ground range 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. (Only properly licensed Amateurs are authorized to operate equipment on Amateur Band frequencies.)

# 2005 Official AMA

## National Model Aircraft Safety Code

- 5) Flying sites separated by three miles or more are considered safe from site-to site interference, even when both sites use the same frequencies. Any circumstances under three miles separation require a frequency management arrangement, which may be either an allocation of specific frequencies for each site or testing to determine that freedom from interference exists. Allocation plans or interference test reports shall be signed by the parties involved and provided to AMA Headquarters. Documents of agreement and reports may exist between (1) two or more AMA Chartered Clubs, (2) AMA clubs and individual AMA members not associated with AMA Clubs, or (3) two or more individual AMA members.
- 6) For Combat, distance between combat engagement line and spectator line will be 500 feet per cubic inch of engine displacement. (Example: .40 engine = 200 feet.); electric motors will be based on equivalent combustion engine size. Additional safety requirements will be per the RC Combat section of the current Competition Regulations.
- 7) At air shows or model flying demonstrations, a single straight line must be established, one side of which is for flying, with the other side for spectators.
- 8) With the exception of events flown under AMA Competition rules, after launch, except for pilots or helpers being used, no powered model may be flown closer than 25 feet to any person.
- 9) Under no circumstances may a pilot or other person touch a powered model in flight.

### **Organized RC Racing Event**

- 10) An RC racing event, whether or not an AMA Rule Book event, is one in which model aircraft compete in flight over a prescribed course with the objective of finishing the course faster to determine the winner.
- A. In every organized racing event in which contestants, callers and officials are on the course:
1. All officials, callers and contestants must properly wear helmets, which are OSHA, DOT, ANSI, SNELL or NOCSAE approved or comparable standard while on the racecourse.
  2. All officials will be off the course except for the starter and their assistant.
  3. "On the course" is defined to mean any area beyond the pilot/staging area where actual flying takes place.
- B. I will not fly my model aircraft in any organized racing event which does not comply with paragraph A above or which allows models over 20 pounds unless that competition event is AMA sanctioned.
- C. Distance from the pylon to the nearest spectator (line) will be in accordance with the current Competition Regulations under the RC Pylon Racing section for the specific event pending two or three pylon course layout.
- 11) RC night flying is limited to low-performance models (less than 100 mph). The models must be equipped with a lighting system that clearly defines the aircraft's attitude at all times.



© 2005 Horizon Hobby, Inc.  
4105 Fieldstone Road  
Champaign, Illinois 61822  
(877) 504-0233  
**horizonhobby.com**