HANGAR 9

FuntanaX 100 ARF

ASSEMBLY MANUAL

Specifications

Wingspan: ..... 69.5 in (1765.30 cm)	Weight: ..... 8–8.5 lb (3.63 kg–4.03 kg)
Length: ..... 68.5 in (1739.90 cm)	Radio: ..... 4-channel w/6 servos
Wing Area: ..... 1107.80 sq in (71.47 sq dm)	Engines: ..... .91–1.00 4-stroke, .61–1.00 2-stroke

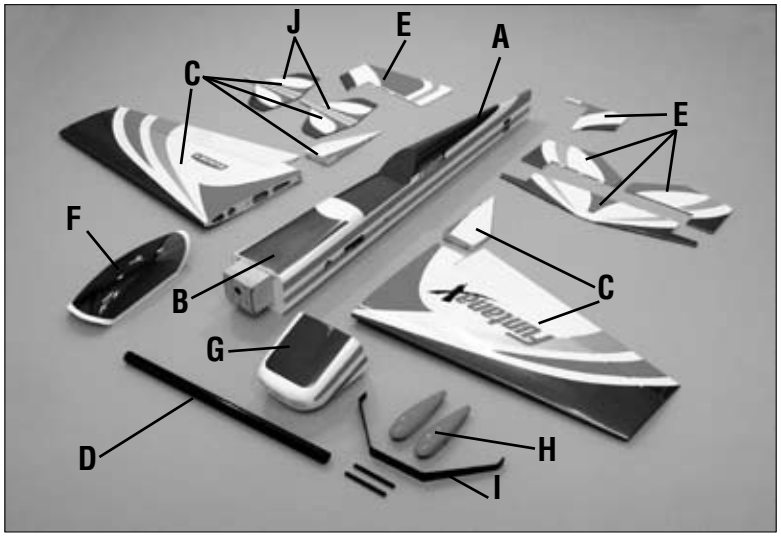
Contents

Introduction

The new FuntanaX 100 .90 3D ARF was designed exclusively for Hangar 9® by Italy's most famous aerobatic pilot, Sebastiano Silvestri. He based the FuntanaX 100 on his highly successful KatanaS TOC design.

The FuntanaX 100 can do it all—harriers, torque rolls, blenders, and almost anything else you can dream up. It's all possible, thanks to an extremely lightweight, all-wood airframe and big control surfaces that give the FuntanaX 100 a very impressive thrust-to-weight ratio and crisp control authority at any airspeed. Sebastiano's signature UltraCote® trim scheme and factory-painted parts such as the cowl and wheel pants complement the performance perfectly.

Contents of Kit



Large Parts:

A.	Fuselage w/Hatch	HAN4176
B.	Fuselage Hatch	HAN4177
C.	Wing Set w/Ailerons	HAN4178
D.	Carbon Fiber Wing Tube	HAN4179
E.	Tail Set	HAN4180
F.	Canopy	HAN4182
G.	Fiberglass Painted Cowl	HAN4183
H.	Fiberglass Painted Whl Pnts	HAN4184
I.	Carbon Fiber Landing Gear	HAN4185
J.	Side Force Generators	HAN4188

Items Not Shown:

Fuel Tank (Assembled)	HAN1987
Engine Mount	HAN90M
2 3/4" Wheels	HAN305
Carbon Fiber Tail Support	HAN4181
Hardware Pack	HAN4186
Decal Set	HAN4187

Radio and Engine Requirements

- 6-channel radio system (minimum)
- 5 high-torque servos (see Servo Selection section)

Recommended JR Systems

- PCM10X
- XP8103
- X-378
- XP662
- XF631

Recommended Engines

- .61 2-stroke
- 1.00 4-stroke

Saito 1.00 FA-AAC
SAIE100

Evolution .61NT
EVOE0610

JR XP6102

JR XP9303

Limited Warranty Period

Horizon Hobby, Inc. guarantees this product to be free from defects in both material and workmanship at the date of purchase.

Limited Warranty & Limits of Liability

Pursuant to this Limited Warranty, Horizon Hobby, Inc. will, at its option, (i) repair or (ii) replace, any product determined by Horizon Hobby, Inc. to be defective. In the event of a defect, these are your exclusive remedies.

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 an authorized Horizon Hobby, Inc. service center. This warranty is limited to the original purchaser and is not transferable. In no case shall Horizon Hobby's liability exceed the original cost of the purchased product and will not cover consequential, incidental or collateral damage. Horizon Hobby, Inc. 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 Hobby, Inc. Further, Horizon Hobby reserves the right to change or modify this warranty without notice.

REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER. HORIZON HOBBY, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

As Horizon Hobby, Inc. 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.

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

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 Hobby, Inc. directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance.

Questions or Assistance

For questions or assistance, please direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll free to speak to a service technician.

Inspection or Repairs

If your 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 Hobby, Inc. is not responsible for merchandise until it arrives and is accepted at our facility. Include your complete name, address, phone number where you can be reached during business days, RMA number, and a brief summary of the problem. Be sure your name, address, and RMA number are clearly written on the shipping carton.

Warranty Inspection and Repairs

To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Providing 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

Should your repair not be covered by warranty and the expense exceeds 50% of the retail purchase cost, you will be provided with an estimate advising you of your options. You will be billed for any return freight for non-warranty repairs. Please advise us of your preferred method of payment. Horizon Hobby 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.

Electronics and engines requiring inspection or repair should be shipped to the following address (freight prepaid):

Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822

All other products requiring inspection or repair should be shipped to the following address (freight prepaid):

Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822

Required Tools and Adhesives

Tools

- Canopy scissors
- Flat blade screwdriver
- Hobby knife
- Paper towels
- Phillips screwdriver (large)
- Pliers
- Sandpaper
- Square
- Felt-tipped pen
- Drill bits: 1/16" (1.5mm), 3/32" (2.5mm), 1/8" (3mm), 5/32" (4mm), 11/64" (4.5mm)
- Drill
- Foam: 1/2”
- Masking tape
- Petroleum jelly
- Phillips screwdriver (small)
- Rubbing alcohol
- Soldering iron
- T-pins

Adhesives

- 6-Minute Epoxy (HAN8000)
- Thin CA (PAAPT07)
- CA Remover/Debonder (PAAPT16)
- CA Remover/Debonder (PAAPT16)
- 30-Minute Epoxy (HAN8002)
- Medium CA (PAAPT01)
- Masking Tape (MMM20901)
- Canopy glue (Formula 560)

Other Required Items

- Epoxy Brushes (DUB345)
- Mixing Sticks for Epoxy (DUB346)
- Rubbing alcohol
- Wax paper
- File
- Paper towels
- Ruler

Servo Selection

The servos used for the control surfaces of the FuntanaX 100 must have a minimum of 50 ounce inch of servo torque. We used JR811 servos in the prototype Funtana.

JR811 Advanced Sport Digital Servo

Torque: 54 oz/in	Speed: .18 sec/60°
Weight: 1.44 oz	Size: 0.75” x 1.49” x 1.52”
Motor: Coreless	Ball Bearing: Dual

For optimum performance, we recommend the JR9411 Precision Digital Servos.

JR9411 Premium Digital Servo

Torque: 82 oz/in	Speed: .15 sec/60°
Weight: 1.36 oz	Size: 0.71” x 1.41” x 1.03”
Motor: Coreless	Ball Bearing: Dual

Covering Colors

- White HANU870
- Sky Blue HANU875
- Deep Blue HANU873

Required Field Equipment

- Propeller (low pitch, large diameter recommended)
- Long Reach Glow Plug Wrench (HAN2510)
- Glow Plug (HAN3001/3006)
- 4-channel radio system (minimum)
- Radio Switch (JRPA003)
- 18" Servo Extension (JRPA099) (3)
- 6 Hi-Torque servos (JRPS811 recommended or equivalent)
- Fuel
- Metered Glow Driver w/Ni-Cd & Charger (HAN7101)
- Manual Fuel Pump (HAN118)
- 12" Servo Extension (JRPA098) (2)
- Large Servo Arm (JRPA215) (2)

Use the Correct Propeller!

The FuntanaX 100 was designed specifically for the 3D flight envelope, which favors thrust over speed. Flying your aircraft at high speeds may cause flutter due to the extremely large control surfaces. To keep the speed down and thrust up, use low-pitch propellers such as a 16x4 APC wide for engines such as the Saito™ 1.00.

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. 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.

Before Starting Assembly

Before beginning the assembly of the FuntanaX 100, 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

Section 1: Aileron Installation

Required Parts

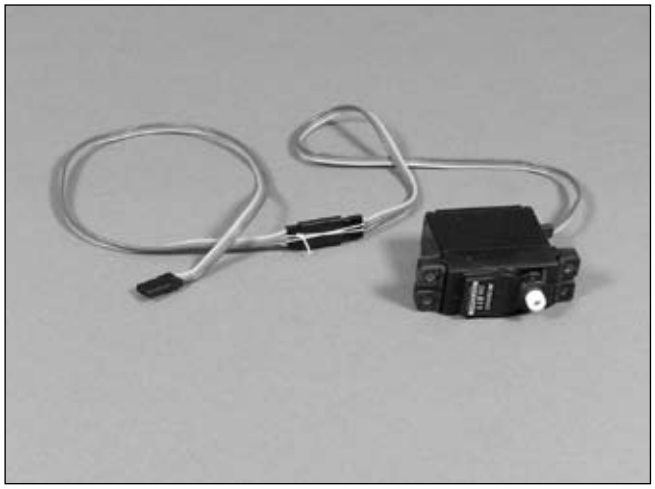
- Wing panel (left and right)
- Aileron (left and right)
- 4-40 x 1/2" screw (2)
- 4-40 lock nut (2)
- Threaded metal clevis (2)
- Clevis retainer (2)
- Nylon ball link (2)
- 4-40 nut (2)
- Nylon control horn (2)
- 4-40 x 2 $^{7}/_{8}$" (73mm) threaded rod (2)
- 2mm x 20mm self-tapping screw (6)
- CA hinge (10)

Required Tools and Adhesives

- Thin CA
- T-pins
- Felt-tipped pen
- Threadlock
- Drill bit: 1/16" (1.5mm)
- Drill
- Square
- Ruler
- Phillips screwdriver (small)
- 12" (305mm) Servo Extension (JRPA098)

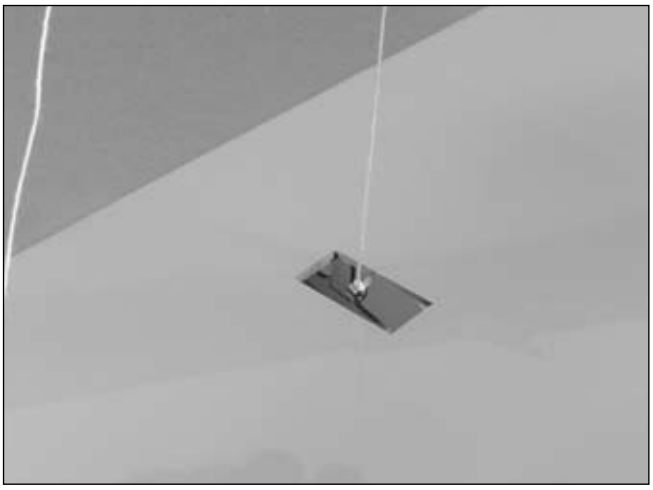
☐ ☐ Step 1

Install the servo hardware (grommets and eyelets) included with the servo. Plug a 12" (305mm) servo extension onto servos. Either tie the servo leads together, using a commercially available connector, or use unwaxed dental floss to secure the extensions to prevent them from coming loose during flight.



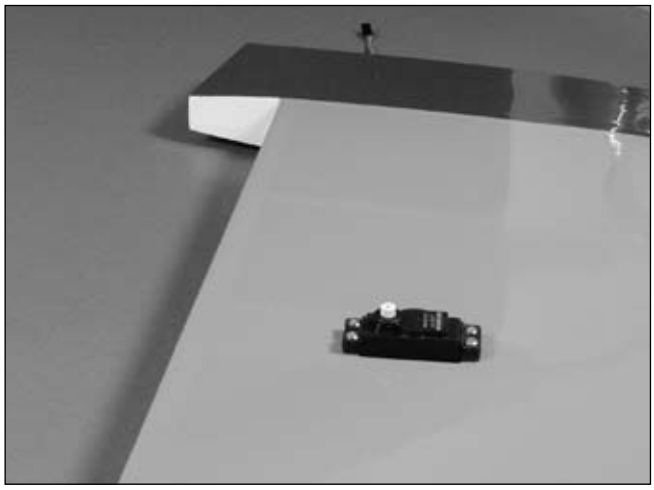
☐ ☐ Step 2

Tie a weight to a piece of string. A wheel collar works great in this application. Lower the string into the wing from the aileron servo opening. Let the weight drop out through the wing root for the servo.



☐ ☐ Step 3

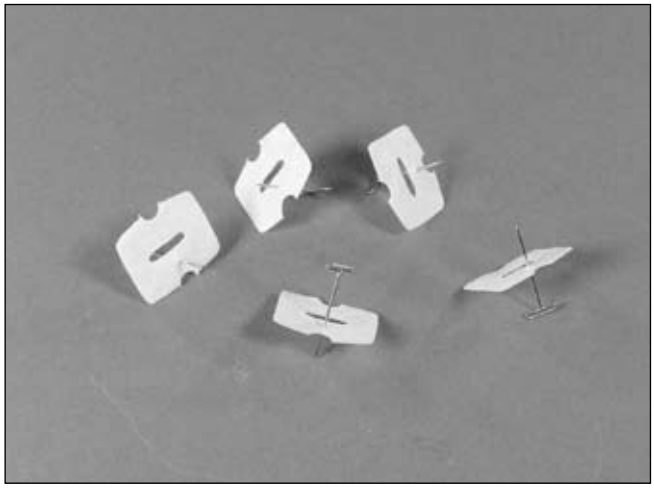
Insert the servo into the opening in the wing. Use the string to pull the servo lead through the wing. Make sure the servo lead exits the root of the wing as shown. Position the servo so the output shaft is towards the trailing edge of the wing. Use a 1/16" (1.5mm) drill bit to drill the locations for the servo screws. Mount the servos using the hardware provided with them.



Note: We recommend that you use the hinges provided. They work extremely well when installed as described. Even though the ailerons are large, we had absolutely no problems.

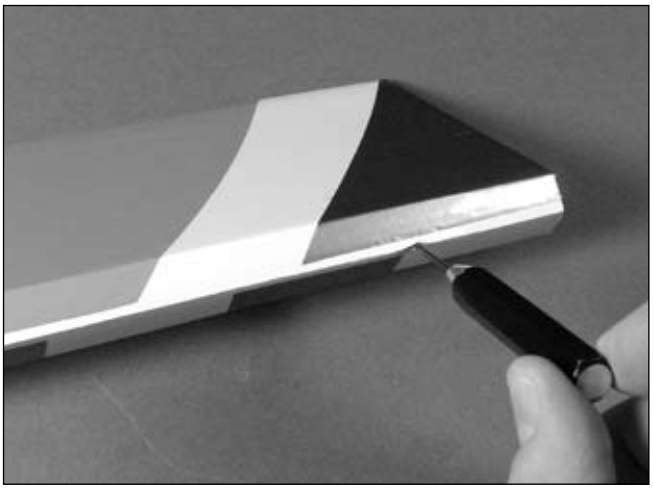
☐ ☐ Step 4

Locate 5 CA hinges. Place a T-pin in the center of the hinges.



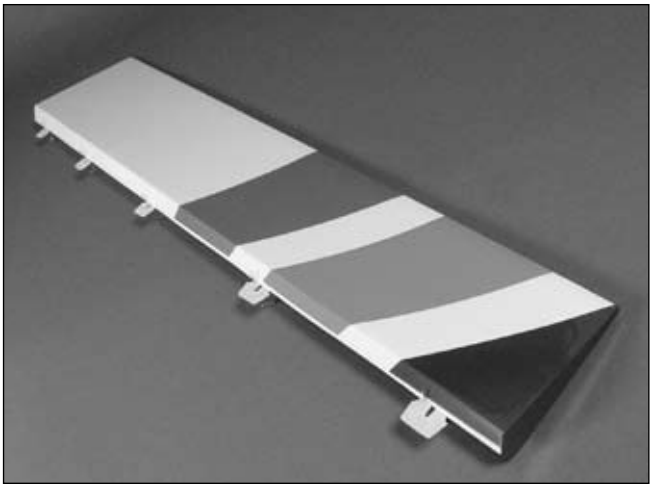
☐ ☐ Step 5

Use a 1/16" (1.5mm) drill bit to drill a hole in the center of each hinge location in both the wing and aileron. This creates a tunnel that the CA can pass through allowing the CA to penetrate further into the hinge.



☐ ☐ Step 6

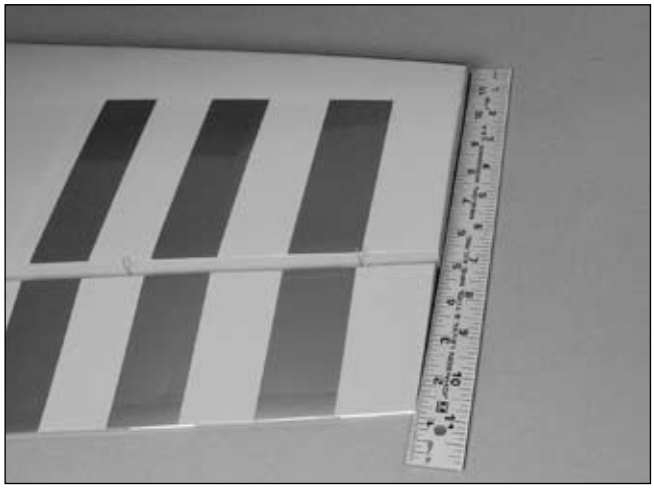
Place the hinges in the precut slots in the aileron (or wing if you prefer). Each T-pin will rest against the edge when installed correctly.



Section 1: Aileron Installation

☐ ☐ Step 7

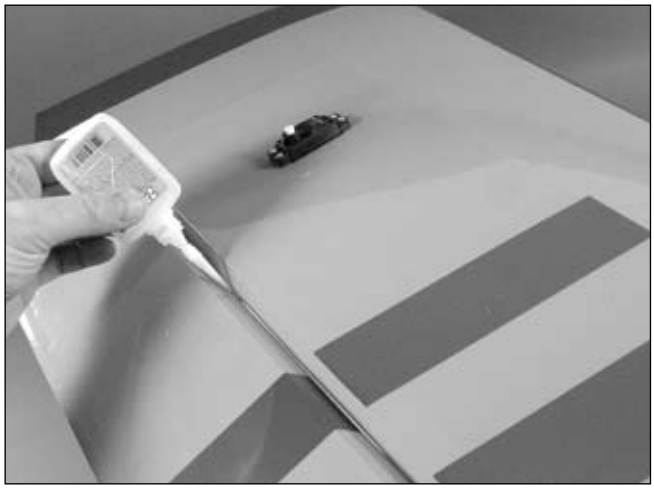
Slide the aileron and wing together. The gap between the aileron and wing should be approximately 1/64" (.4mm). Use a ruler to align the end of the aileron to the wing, leaving enough gap so the aileron will not rub against the tip force generator. Also check that the aileron can move freely and not bind at the wing root.



Note: Do not use CA accelerator during the hinging process. The CA must be allowed to soak into the hinge to provide the best bond. Using accelerator will not provide enough time for this process.

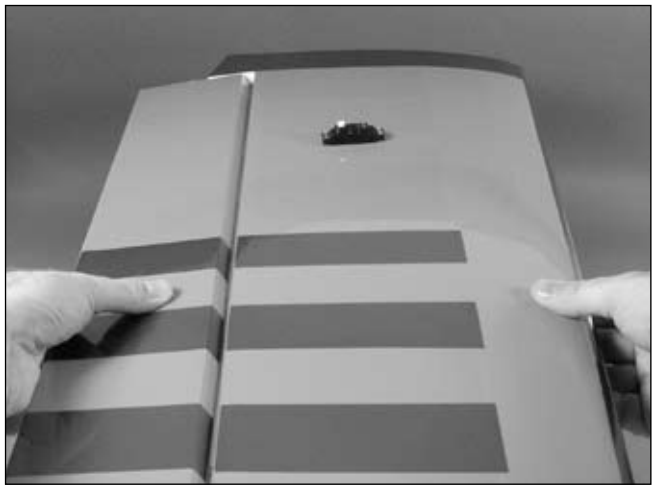
☐ ☐ Step 8

Remove the T-pins and apply Thin CA to each hinge. Make sure the hinge is fully saturated with CA. Use a paper towel and CA remover/debonder to clean up any excess CA from the wing and/or aileron.



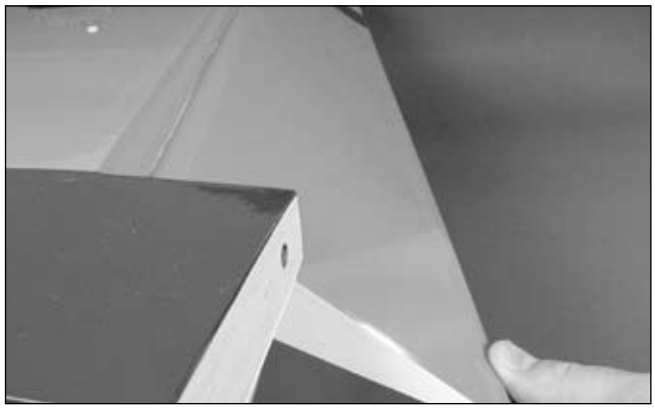
☐ ☐ Step 9

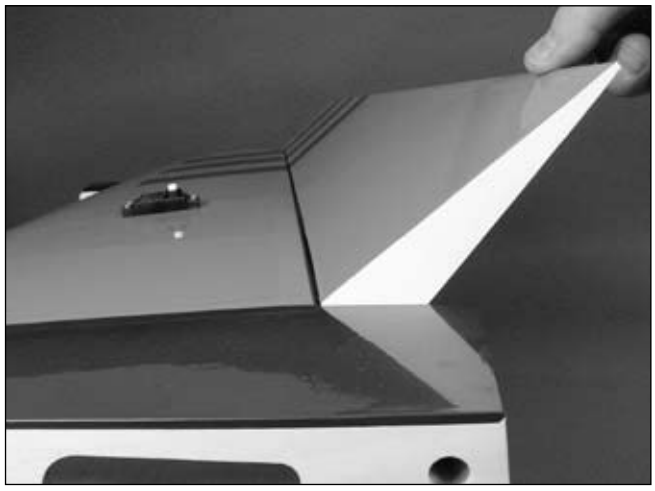
Firmly grasp the wing and aileron and gently pull on the aileron to ensure the hinges are secure and cannot be pulled apart. Use caution when gripping the wing and aileron to avoid crushing the structure.



☐ ☐ Step 10

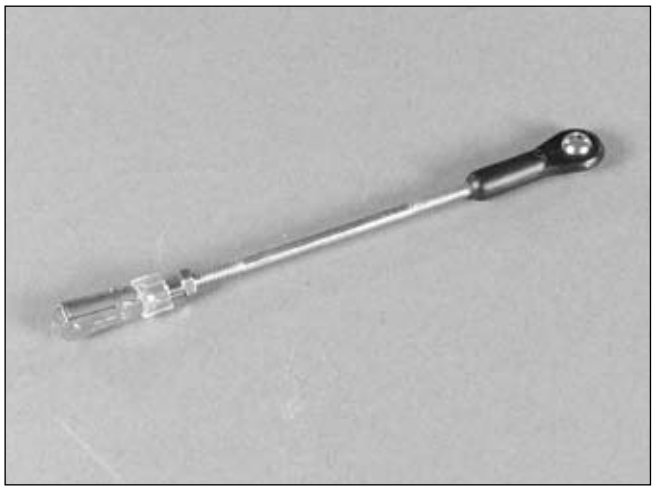
Work the aileron up and down several times to work in the hinges and check for proper movement.





☐ ☐ Step 11

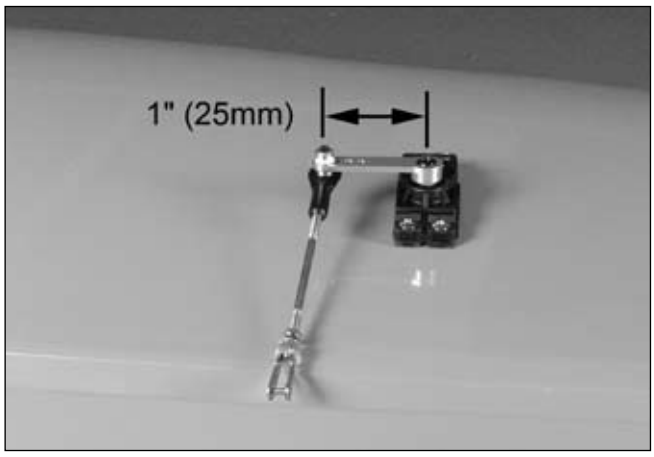
Locate the metal clevis 4-40 nut, clevis retainer and nylon ball link. Thread the 4-40 nut onto one end of a 4-40 x 2 $^{7}/_{8}$" (73mm) threaded rod. Slide a clevis retainer onto a metal clevis and thread the clevis up against the nut. A small amount of the rod will be visible between the forks of the clevis. Tighten the nut against the clevis to prevent it from loosening. Thread the nylon ball end onto the other end of the threaded rod.



Note: It is suggested that threadlock be used on the nut and clevis, once the length has been determined, to prevent them from loosening during flight.

☐ ☐ Step 12

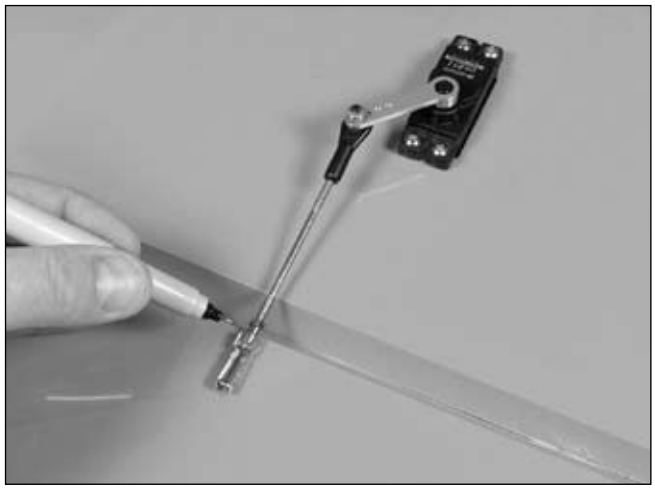
Attach the ball end to the underside of a heavy-duty servo arm using a 4-40 x 1/2" socket head screw and 4-40 locknut. Attach the linkage 1" (25mm) from the center of the arm. Attach the servo arm onto the servo. Position the arm parallel to the aileron hinge line.



Note: Attach the servo arm so it faces towards the wing root.

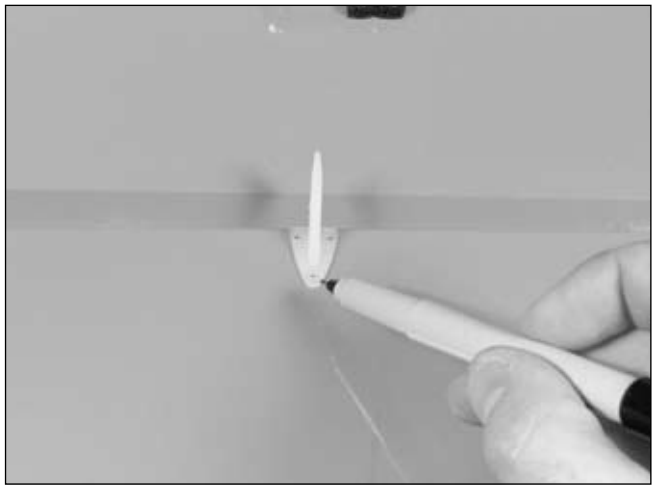
☐ ☐ Step 13

Use the radio to move the servo to its full throw. See the notes under “Control Throws” about setting up your radio travel adjustments first. Position the pushrod so it is 90 degrees to the hinge line and mark where it crosses onto the aileron using a felt-tipped pen.



☐ ☐ Step 14

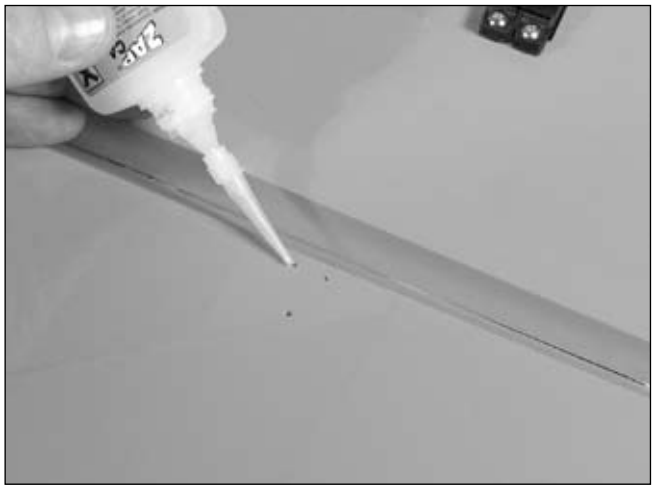
Remove the backplate from one of the control horns. Place the control horn at the mark made in the last step. Mark the locations for the control horn screws using a felt-tipped pen.



Section 1: Aileron Installation

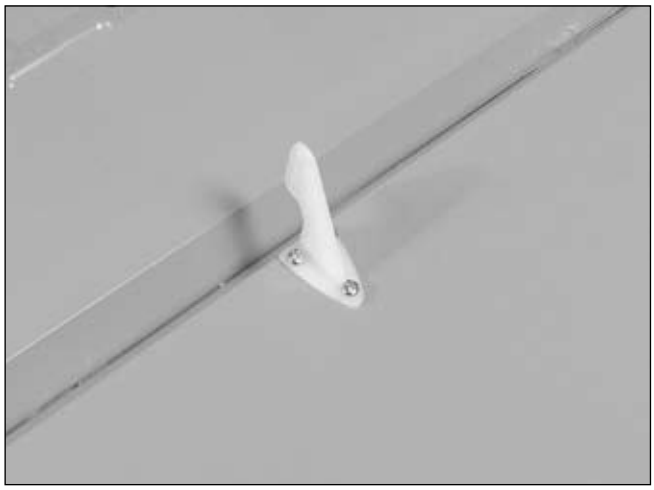
☐ ☐ Step 15

Using a 1/16" (1.5mm) drill bit, carefully drill the holes for mounting the control horn. Apply 2–3 drops of thin CA into each of the three holes. This will harden the wood and prevent the screws from pulling out during flight.



☐ ☐ Step 16

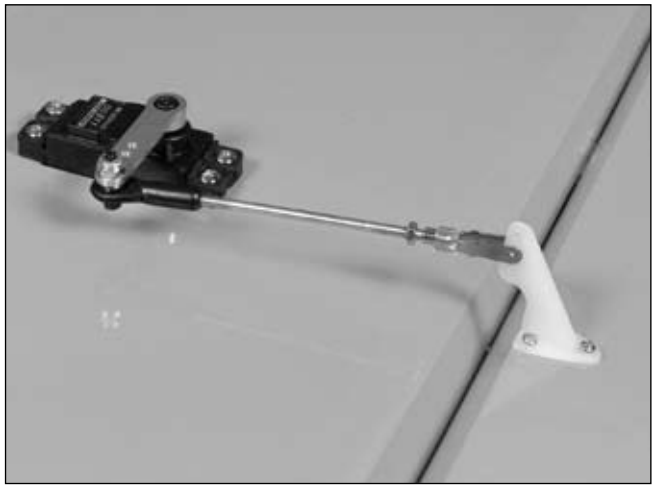
Attach the control horn to the aileron using three 2mm x 20mm self-tapping screws.



Note: If the control horn's screws do not feel secure, remove them and put a few more drops into the holes.

☐ ☐ Step 17

Adjust the aileron linkage so the aileron is centered when the linkage is connected to the control horn. The clevis attaches to the middle hole of the control horn as shown.



☐ Step 18

Repeat Steps 1 through 17 for the remaining aileron.

Note: Once the ailerons have been installed, it is suggested to seal the hinge gap from the bottom of the aileron using either clear tape or clear covering.

Section 2: Wing Installation

Required Parts

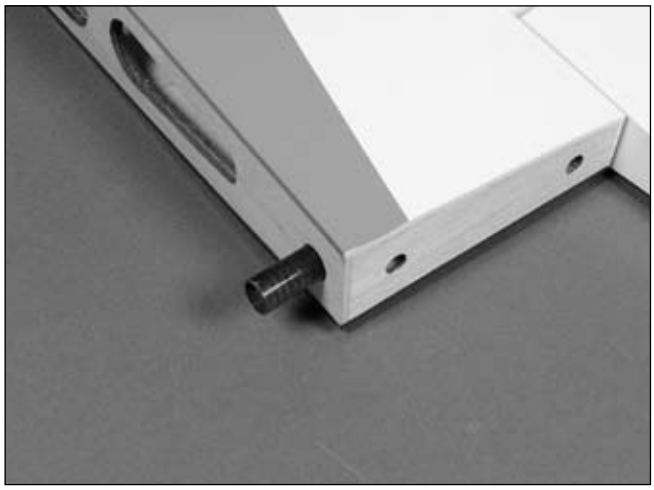
- Wing panel (right and left)
- 1/4-20 x 2" nylon bolt (2)
- Anti-rotation pin (2)
- Wing fillet (right and left)
- Fuselage
- Wing tube

Required Tools and Adhesives

- 6-minute epoxy
- Masking tape
- Epoxy brush

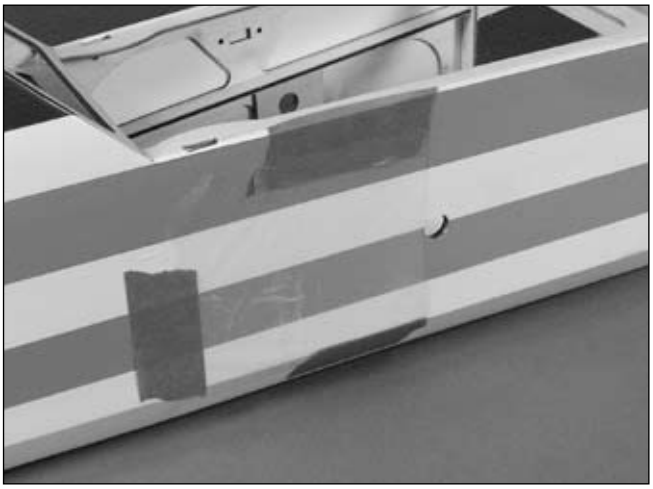
☐ ☐ Step 1

Locate an anti-rotation pin and test fit it into one of the wing panels. The pin should extend roughly 3/4" (19mm) from the edge of the wing. Once satisfied with the fit, rough the tube using sandpaper then glue it into the wing using 6-minute epoxy. The tube must be glued securely into the wing.



☐ ☐ Step 2

Cut a piece of the plastic packaging and tape it to the side of the fuselage in the location of the wing fillet attachment. This will prevent getting epoxy on the fuselage in later steps, and gluing the wing and/or fillet to the fuselage by accident.



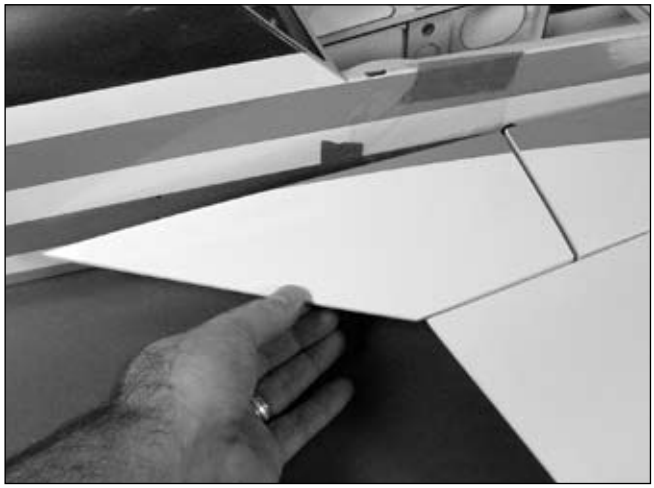
☐ ☐ Step 3

Locate the wing tube and carefully slide it into one wing panel. Slide the wing (with tube) into the wing tube opening in the fuselage.

Section 2: Wing Installation

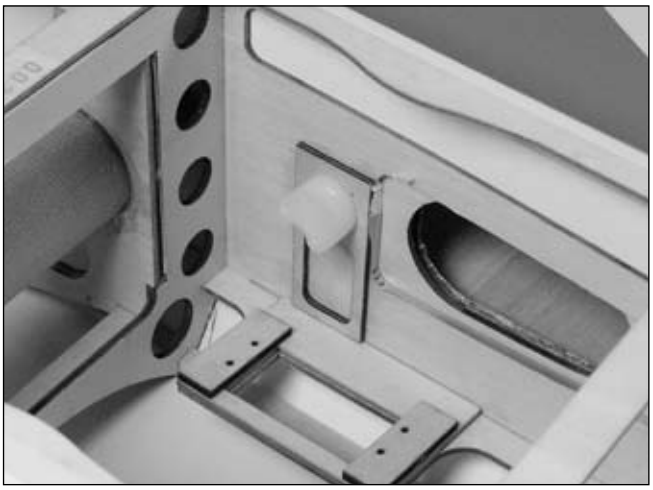
☐ ☐ Step 4

Locate the corresponding wing fillet to the wing. Test fit the fillet by pulling the wing slightly away from the fuselage and aligning the two dowels in the fillet with the corresponding holes in the wing. Slide the wing against the fuselage, guiding the alignment pin of the wing and fillet into the locations in the fuselage.



☐ ☐ Step 5

Once satisfied with the fit, glue the wing fillet to the wing using 6-minute epoxy. Secure the wing to the fuselage using a 1/4-20 x 2" bolt and use tape on the fillet-to-wing connection. This will keep everything in alignment until the epoxy fully cures.



☐ Step 6

Repeat Steps 1 through 5 for the remaining wing panel and wing fillet.

Section 3: Tail Installation

Required Parts

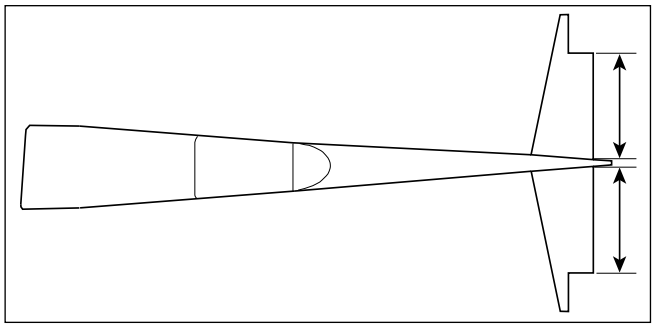
- Wing
- Horizontal stabilizer
- Fuselage
- Vertical stabilizer

Required Tools and Adhesives

- 30-minute epoxy
- Hobby knife
- Square
- Sandpaper
- Felt-tipped pen
- Ruler

☐ Step 1

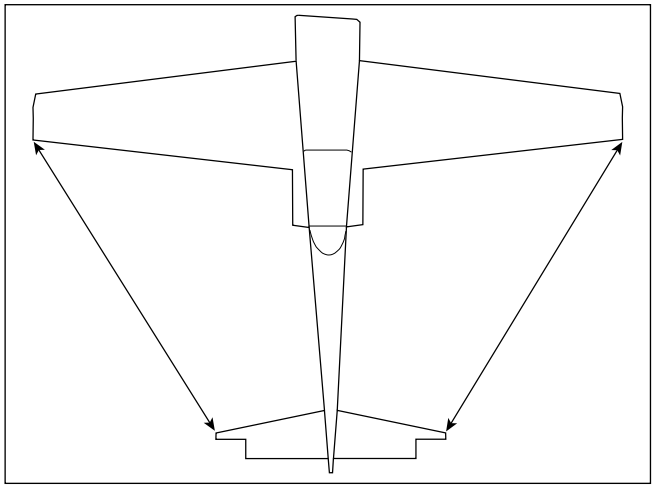
Slide the stab into the fuselage. Center the stab in the opening by measuring the distance from the fuselage to each tip. The stab is aligned when both measurements are identical.



Hint: The stabilizers can be installed temporarily to aid in getting the stabilizer centered in the fuselage. Just don't glue the hinges so they can be removed once the stabilizer is aligned.

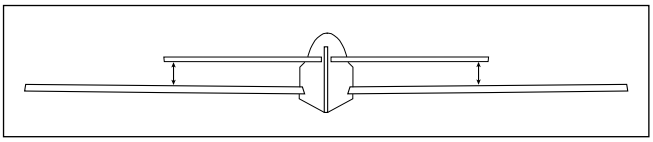
☐ Step 2

Check the distance from each stab tip to each wing tip. These measurements must be equal.



☐ Step 3

The last alignment step is making sure the wing and stabilizer are parallel. If they are not, sand the opening in the fuselage for the stab until the stab rests parallel to the wing.

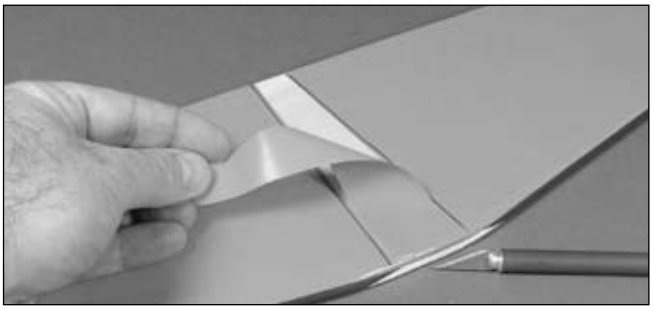


☐ Step 4

Use a felt-tipped pen to trace the outline of the fuselage on the stab.

☐ Step 5

Remove the stab and use a hobby knife with a brand new blade to remove the covering 1/16" (1.5mm) inside the lines just drawn.



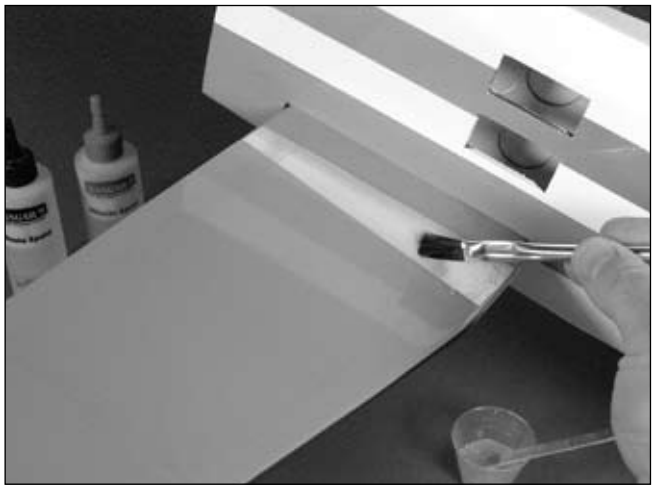
Note: DO NOT cut into the underlying wood. Let the knife "float" across the covering. Cutting into the wood will weaken the stabilizer and may cause it to fail in flight.

Hint: You can use a soldering iron instead of a hobby knife to remove the covering. Doing so will eliminate accidentally cutting into the stabilizer.

Section 3: Tail Installation

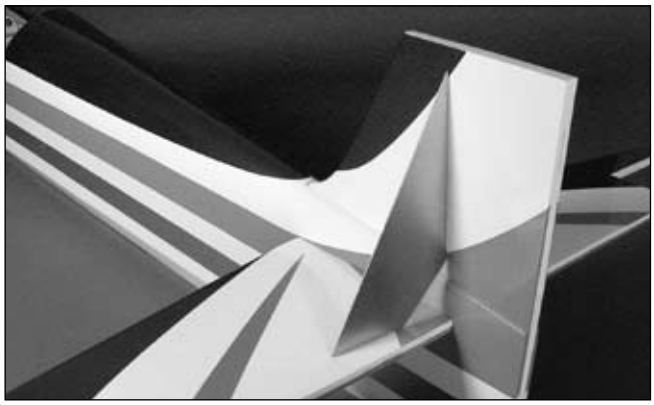
☐ Step 6

Mix 1/2 (15 ml) ounce of 30-minute epoxy. Apply epoxy to the top and bottom of the exposed wood of the stabilizer. Slide the stabilizer the rest of the way into the slot in the fuselage. Double-check the alignment to verify it is correct. Remove any excess epoxy using a paper towel and rubbing alcohol. Allow the epoxy to fully cure before continuing.



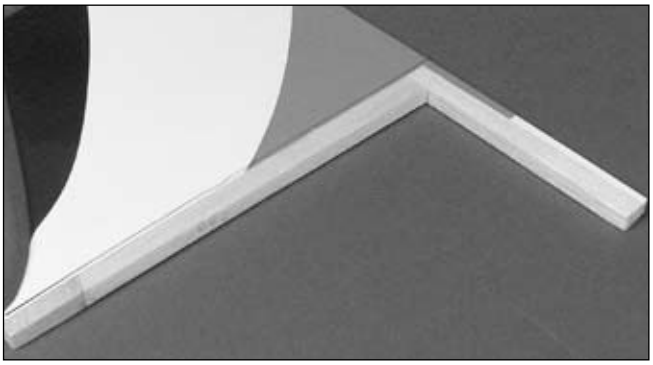
☐ Step 7

Locate the vertical stabilizer (fin) and slide it into position. Check the alignment between the fin and stab. The fin must be 90 degrees to the stab to be in alignment. Sand the opening in the fuselage if necessary to get the perfect alignment.



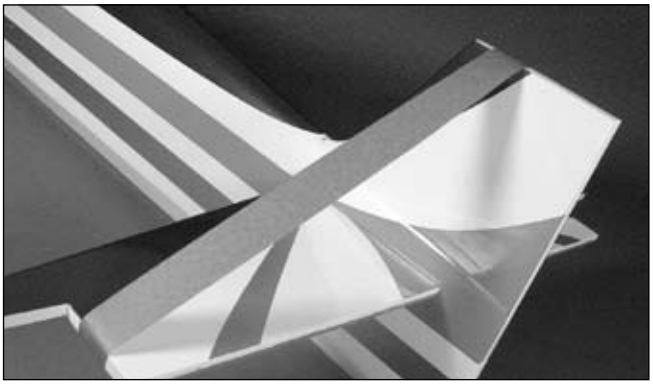
☐ Step 8

Trace the outline of the fuselage onto the fin. Remove the covering 1/16" (1.5mm) below the line.



☐ Step 9

Mix 1/2 ounce (15 ml) of 30-minute epoxy. Apply the epoxy to the fin where the covering was removed. Position the fin in the slot and check the alignment. Use masking tape to hold the fin in position until the epoxy fully cures.



Hint: Use rubbing alcohol and a paper towel to clean up any excess epoxy. Remember, this only works before the epoxy cures.

Section 4: Elevator Installation

Required Parts

- Fuselage
- Elevator (right and left)
- CA hinge (6)

Required Tools and Adhesives

- 4-40 nut (2)
- 4-40 lock nut (2)
- Threaded metal clevis (2)
- 2mm x 16mm (6)
- Drill
- Nylon ball link (2)
- T-pins
- Clevis retainer (2)
- Dental floss or string
- Thin CA
- 4-40 x 1/2" socket head screw (2)
- Nylon control horn w/backplate (2)
- 4-40 x $3\frac{7}{8}$" (98mm) threaded rod
- 4-40 x $5\frac{1}{2}$" (140mm) threaded rod
- Drill bit: 1/16" (1.5mm) 3/32" (2.5mm)
- 18" (457mm) Servo Extensions (JRPA099) (2)
- HD 1/2 Servo Arm 4-40: JR (2) (HAN3574)
- Reversing Y-Harness (JRPA133) (Optional)

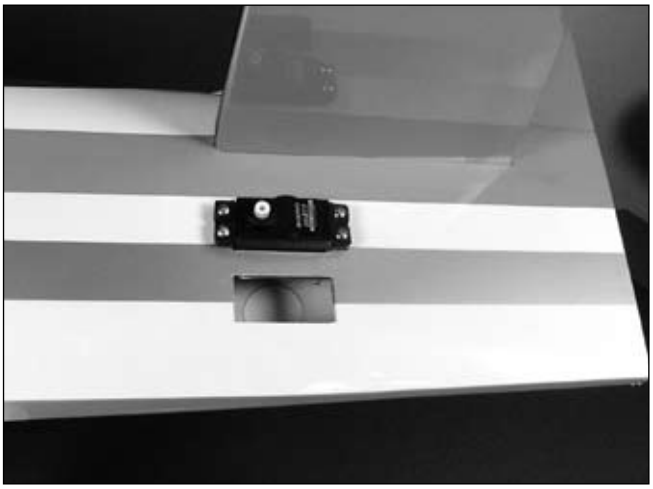
☐ ☐ Step 1

Install two 18" (457mm) servo extensions, one on each servo. Either tie the servo leads together, using a commercially available connector, or use unwaxed dental floss to secure the extensions to prevent them from coming loose during flight. Also install the servo hardware (grommets and eyelets) at this time.

> **Note**: Using two standard rotation servos and a standard Y-harness for the elevator servos will result in them moving in opposite directions instead of the same direction. As such, the elevator servo installation will either require the use of one reversed rotation servo and one standard rotation servo or a reversing Y-harness. It is highly recommended to use a computer radio or a JR® MatchBox™ to link the two elevator servos to operate properly.

☐ ☐ Step 2

Fasten the elevator servo in place using the screws included with the servo.



☐ ☐ Step 3

Locate the metal clevis 4-40 nut, clevis retainer and nylon ball link. Thread the 4-40 nut onto one end of a 4-40 x $3\frac{7}{8}$" (98mm) threaded rod. Slide a clevis retainer onto a metal clevis and thread the clevis up against the nut. A small amount of the rod will be visible between the forks of the clevis. Tighten the nut against the clevis to prevent it from loosening. Thread the nylon ball end onto the other end of the threaded rod. Attach the ball end to the servo arm 1" (25mm) from the center of the horn using a 4-40 x 1/2" screw and 4-40 locknut.

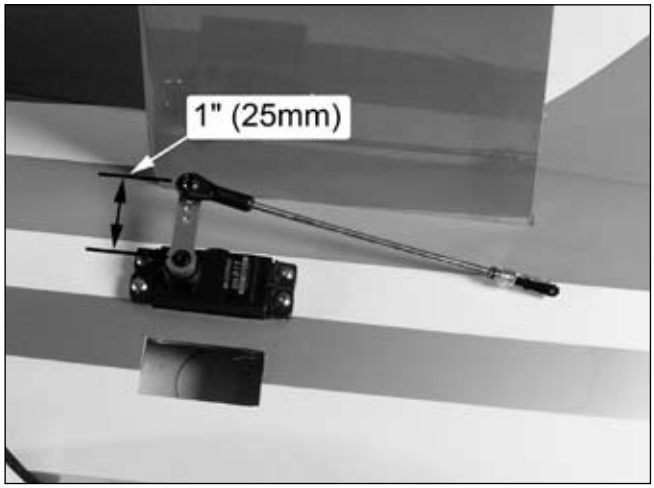
> **Note**: It is suggested that threadlock be used on the nut and clevis to prevent them from loosening during flight.

> **Note**: Attach the ball end so it will be on the outside of the control horn.

Section 4: Elevator Installation

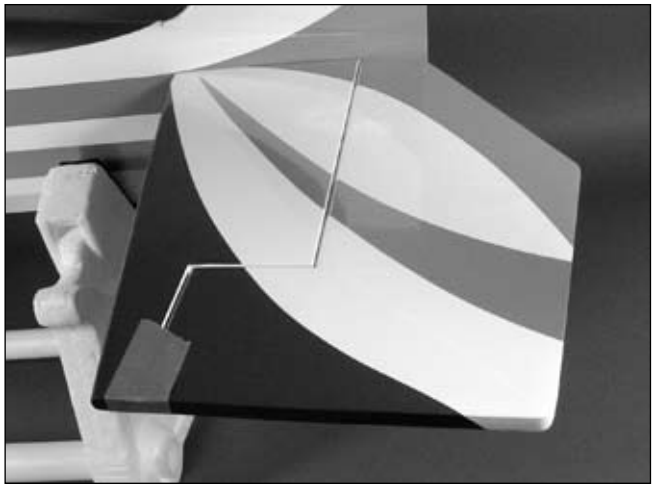
☐ ☐ Step 4

Plug in the elevator servo and turn on the radio system to center the servo. Place the servo arm on the elevator servo as shown.



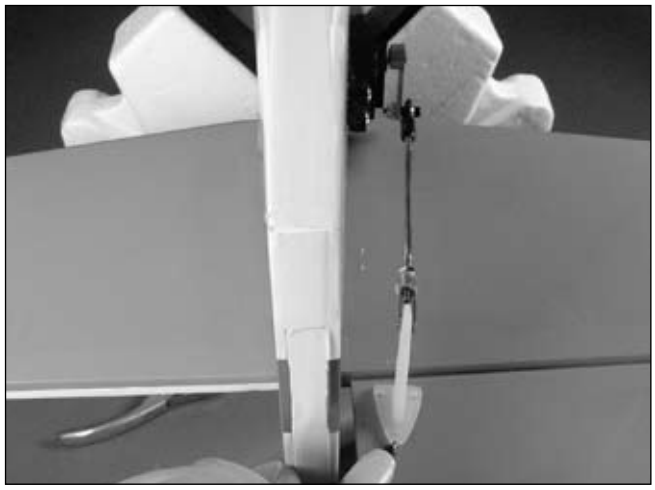
☐ ☐ Step 5

Use two hinges to temporarily attach the elevator to the stabilizer, aligning the tip of the elevator with the tip of the stabilizer. Use tape to hold the elevator in position for the next step. DO NOT glue the hinges at this time.



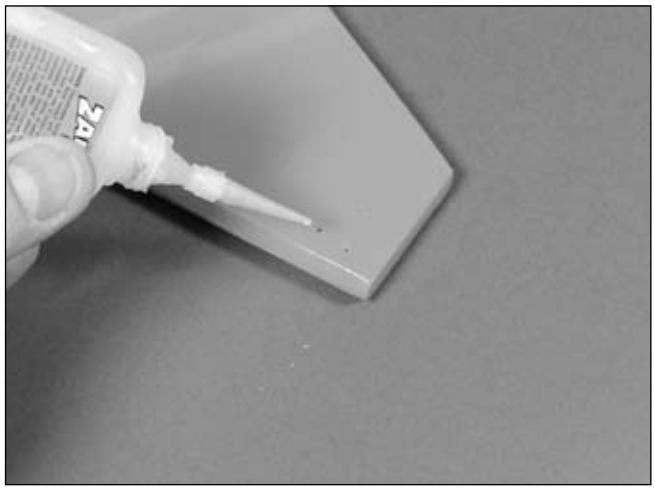
☐ ☐ Step 6

Remove the back plate from one of the control horns and connect the clevis to the center hole. Position the control horn so the holes in the horn align with the hinge line. Having the linkage attached will allow you to position the linkage parallel to the side of the fuselage. Transfer the location of the control horn mounting holes onto the elevator using a felt-tipped pen.



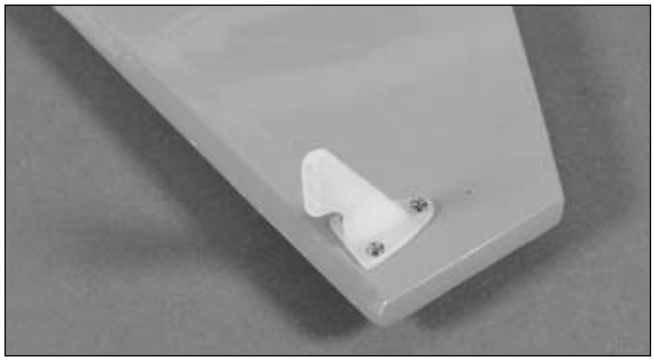
☐ ☐ Step 7

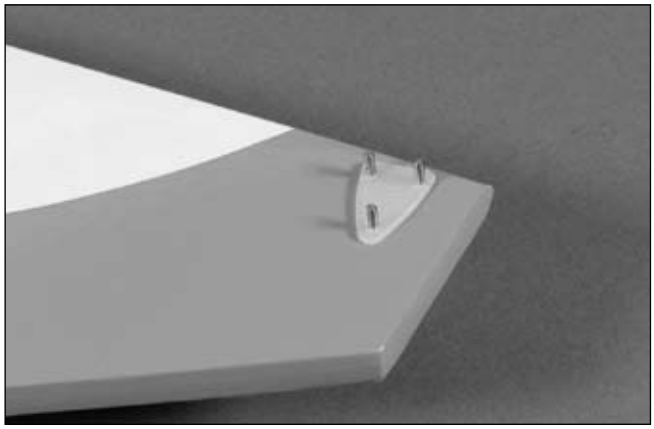
Remove the elevator and use a drill and 3/32" (2.5mm) drill bit to carefully drill the holes for mounting the control horn. Apply 2–3 drops of thin CA into each of the three holes. This will harden the wood and prevent the screws from crushing the underlying wood.



☐ ☐ Step 8

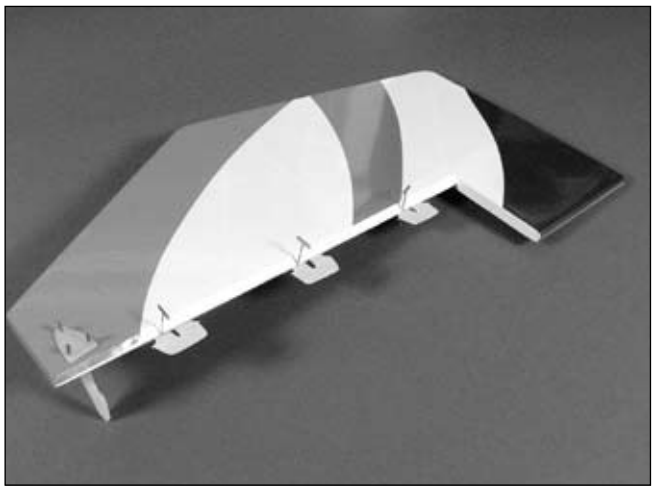
Attach the control horn to the elevator using three 2mm x 16mm screws and the control horn back plate.





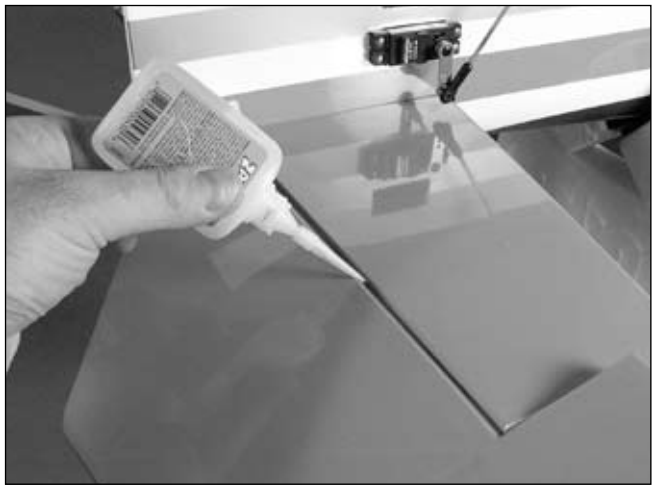
☐ ☐ Step 9

Drill a 1/16" (1.5mm) hole in the center of each hinge slot in both the stabilizer and elevator. Locate the three CA hinges, and place T-pins in the center as shown. Install the hinges in the elevator.



☐ ☐ Step 10

Test fit the elevator to the stabilizer. Make sure the elevator rests tight against the stabilizer. Align the tip of the elevator to the tip of the stabilizer. Check to make sure the elevator moves freely. Apply thin CA to both sides of the hinge. Make sure to saturate the hinge, and don't use accelerator. Use a paper towel and CA debonder/remover to clean up any excess CA.

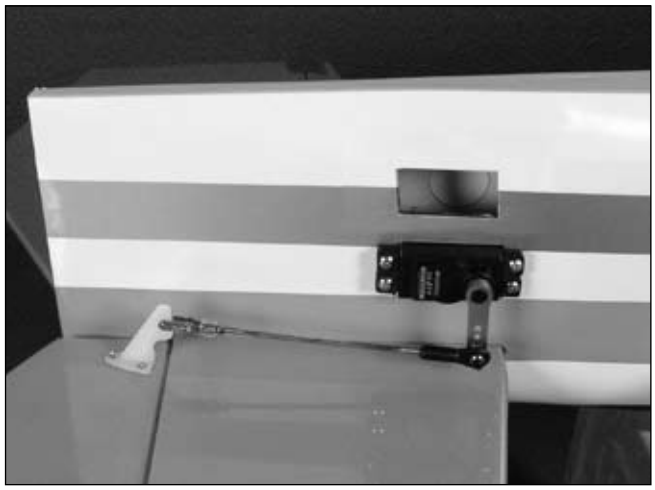


☐ ☐ Step 11

Once the CA has fully cured, give the elevator and stabilizer the tug test to make sure the hinges are well glued. Flex the elevator a few times to break in the hinges.

☐ ☐ Step 12

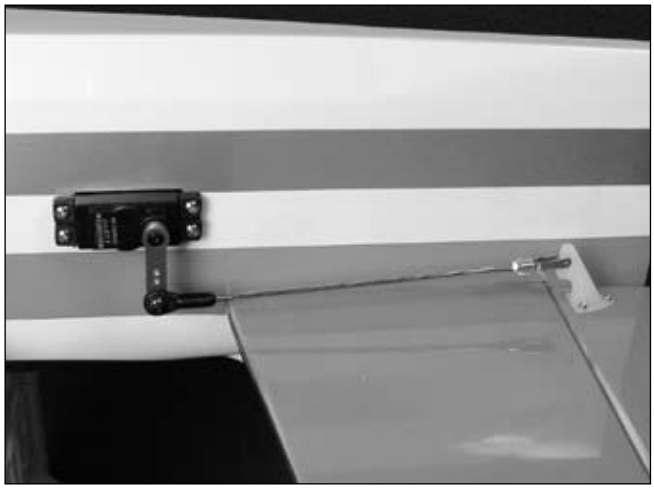
Adjust the elevator linkage so when the servo is centered the elevator is in the neutral position. The clevis attaches to the middle hole of the control horn as shown.-



Section 4: Elevator Installation

☐ **Step 13**

Repeat Steps 1 through 12 for the second elevator servo. The length of the linkage for Step 3 will be 5 1/2" (140mm).



Section 5: Rudder Installation

Required Parts

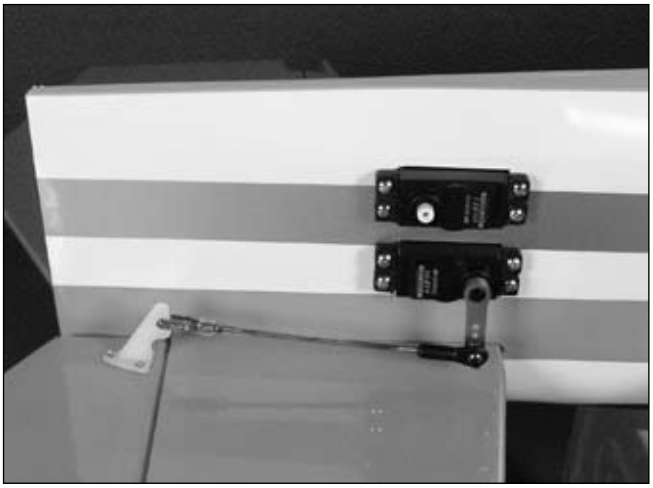
- Fuselage assembly
- Rudder
- Tail wheel assembly
- 4-40 x 5" (127mm) threaded rod
- 1" (25mm) tail wheel
- 5/64" wheel collar w/setscrew

Required Tools and Adhesives

- CA hinge (3)
- T-pins
- Hobby knife
- Thin CA
- 6-minute epoxy
- Petroleum jelly
- Dental floss or string
- Drill
- Drill bit: 1/16" (1.5mm) 1/8" (3mm)
- Hex wrench (included in kit)
- 18" (457mm) Servo Extensions (JRPA099)

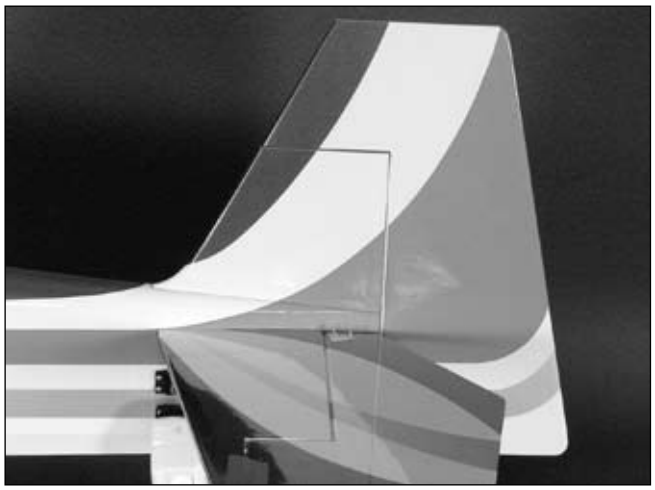
☐ **Step 1**

Secure an 18" (457mm) servo extension to the rudder servo. Install the servo hardware then secure the servo to the fuselage.



☐ Step 2

Drill 1/16" (1.5mm) holes in the center of each hinge slot, both the rudder and fin. Locate the three CA hinges, and place T-pins in the center as shown. Install the hinges in the rudder. Test fit the rudder to the fuselage. Use tape to hold the rudder in position for the next few steps.



☐ Step 3

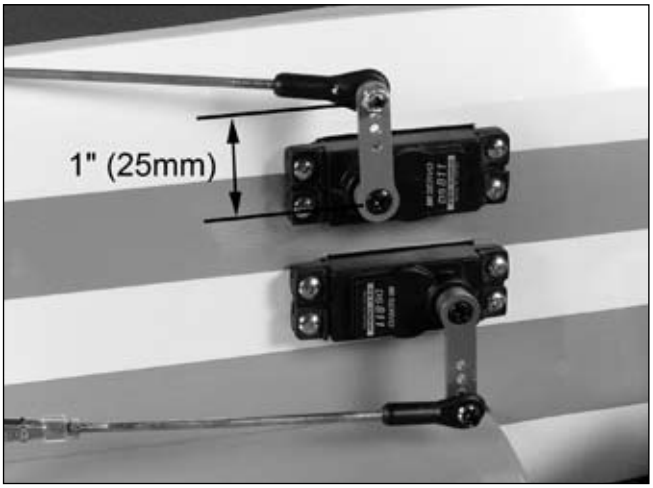
Locate the metal clevis 4-40 nut, clevis retainer and nylon ball link. Thread the 4-40 nut onto one end of a 4-40 x 5" (127mm) threaded rod. Slide a clevis retainer onto a metal clevis and thread the clevis up against the nut. A small amount of the rod will be visible between the forks of the clevis. Tighten the nut against the clevis to prevent it from loosening. Thread the nylon ball end onto the other end of the threaded rod. Attach the ball end to the servo arm 1" (25mm) from the center of the servo using a 4-40 x 1/2" screw and 4-40 locknut.

> **Note**: It is suggested that threadlock be used on the nut and clevis to prevent them from loosening during flight.

> **Note**: Attach the ball end so it will be on the inside of the control horn.

☐ Step 4

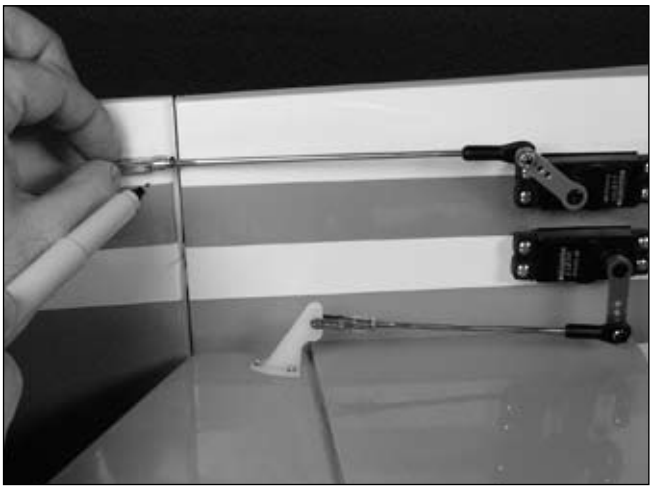
Plug in the rudder servo and turn on the radio system to center the servo. Place the servo arm on the rudder servo as shown.



> **Note**: See the section of setting the control throws and adjusting the travel adjustment before proceeding.

☐ Step 5

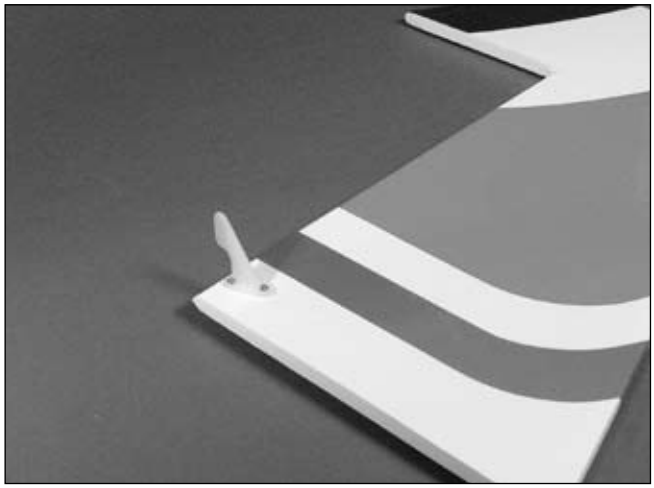
Use the radio to move the rudder servo to the full right position. Align the rudder pushrod so it is parallel to the elevator. Mark the location where the pushrod crosses onto the rudder.



Section 5: Rudder Installation

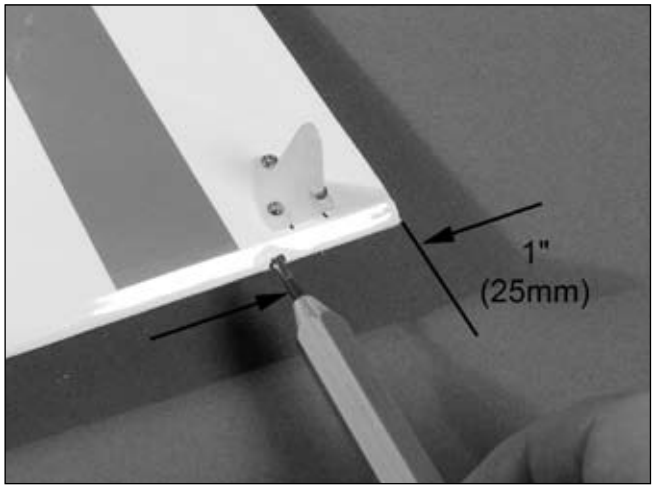
☐ Step 6

Remove the rudder from the fin. Use the mark from the last step to locate the control horn. Use a felt-tipped pen to mark the locations for the control horn. Drill the locations using a 3/32" (2.5mm) drill bit. Harden the holes using thin CA. Attach the control horn using three 2mm x 16mm screws and the control horn backplate.



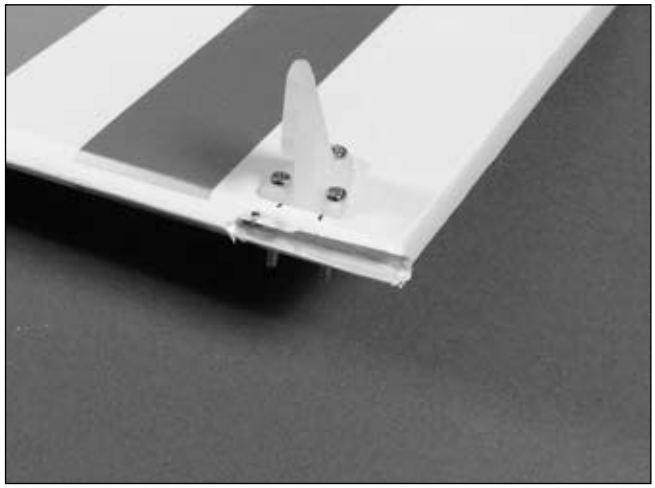
☐ Step 7

Make a mark 1" (25mm) from the bottom of the rudder. Drill the location using a 1/8" (3mm) drill bit. Make sure the drill is perpendicular to the hinge line of the rudder.



☐ Step 8

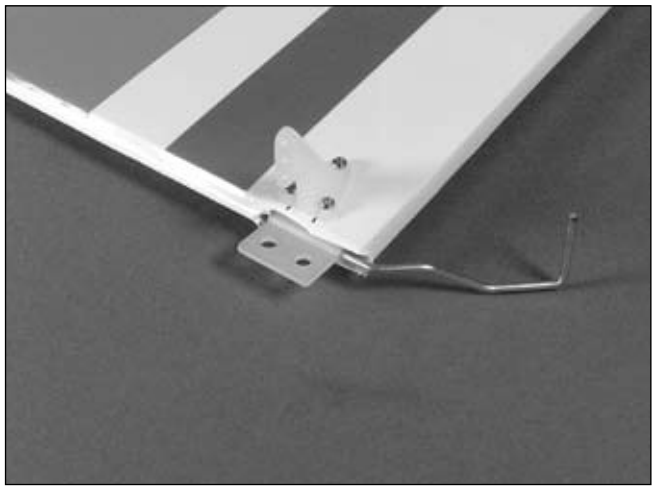
Cut a groove from the hole to the bottom of the rudder. This is necessary to provide clearance for the tail wheel bearing.



Hint: An 11/64" (4.5mm) drill bit can be used to size the notch perfectly to the nylon bushing of the tail wheel assembly.

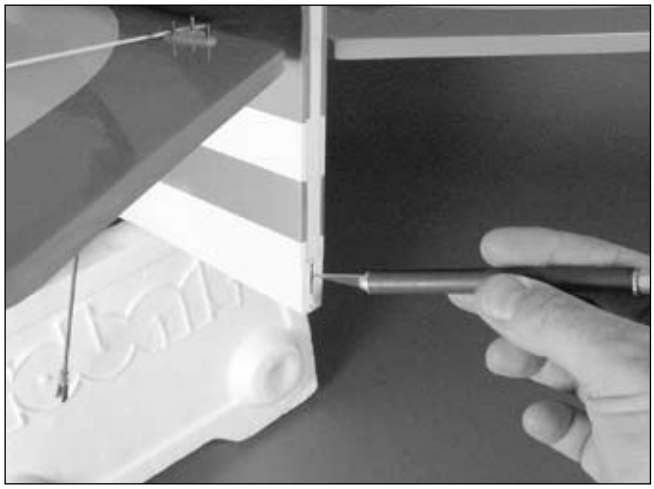
☐ Step 9

Test fit the tail wheel bracket into the rudder. Make sure there is plenty of clearance for the bracket bushing and the hole has been drilled deep enough to fit the tail wheel wire.



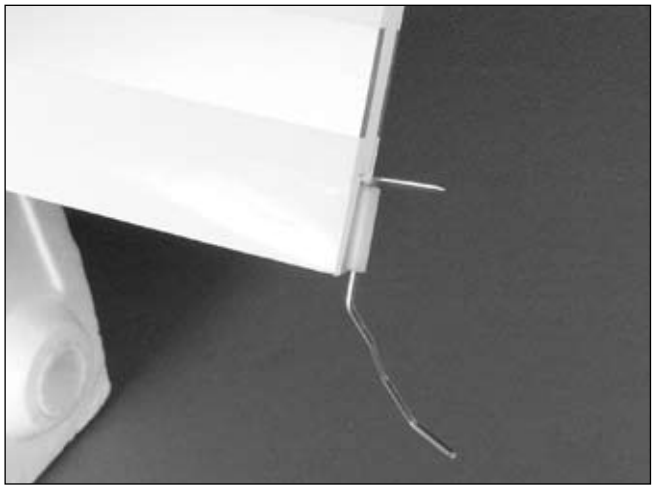
☐ Step 10

Cut a slot in the aft end of the fuselage for the tail wheel bearing using a hinging tool or hobby knife. Position the top of the slot 1" (25mm) from the bottom of the fuselage. The slot should be 7/8" (23mm) long, which is the length of the tail wheel bearing.



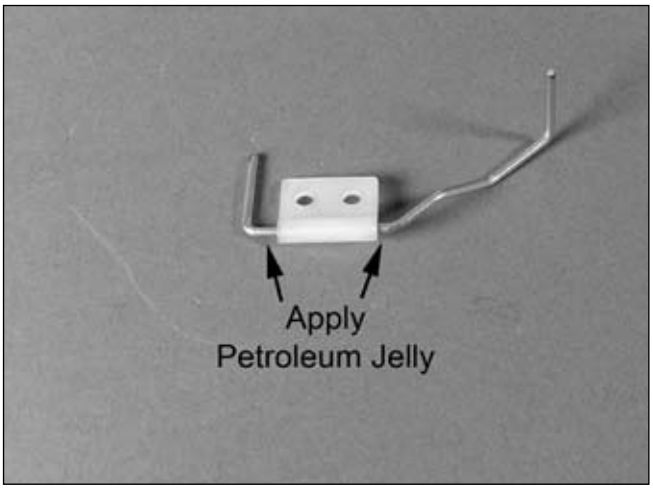
☐ Step 11

Test fit the tail wheel bearing into the slot. Make the slot large enough that the bushing will fit without forcing the wood apart.



☐ Step 12

Apply a light coat of petroleum jelly onto the tail gear wire where the bearing will ride. This is done to prevent the epoxy from sticking to the wire and bearing, which would make it a little difficult to steer or even use the rudder.



☐ Step 13

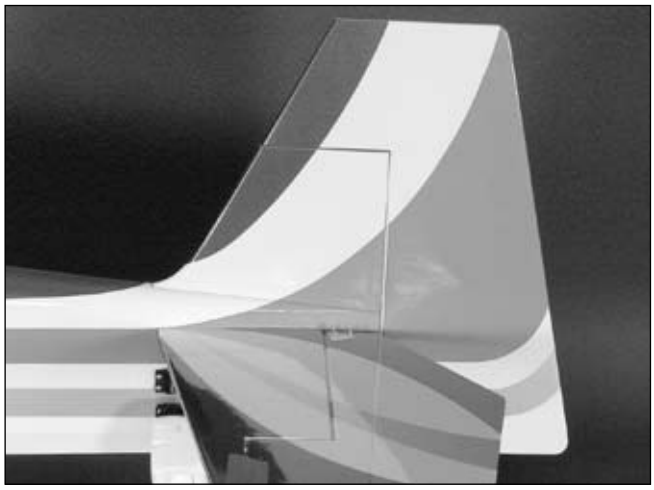
Mix 1/2 ounce of 6-minute epoxy and apply it to both the tail gear bearing and the slot in the fuselage. Install the bearing into the fuselage. Use a paper towel and rubbing alcohol to remove any excess epoxy from the tail gear wire, bushing, and fuselage.

> **Hint**: You can combine the previous step with the following step if you like. This will hold the rudder in position while the epoxy cures.

Section 5: Rudder Installation

☐ Step 14

Fit the rudder back onto the fuselage, making sure the tail wheel can move without binding. Check to make sure the rudder moves freely. It should not rub against the fin at the tip. Apply thin CA to both sides of the hinge. Make sure to saturate the hinge, and don't use accelerator. Use a paper towel and CA debonder/remover to clean up any excess CA.



☐ Step 15

Once the CA and epoxy has fully cured, give the rudder and fin the tug test to make sure the hinges are well glued. Flex the rudder a few times to break in the hinges.

☐ Step 16

With the rudder servo centered, connect the linkage to the middle hole of the rudder control horn. Adjust the length of the linkage so the rudder is in neutral.

☐ Step 17

Attach the tail wheel to the tail wheel assembly using a 5/64" wheel collar.

Section 6: Landing Gear Installation

Required Parts

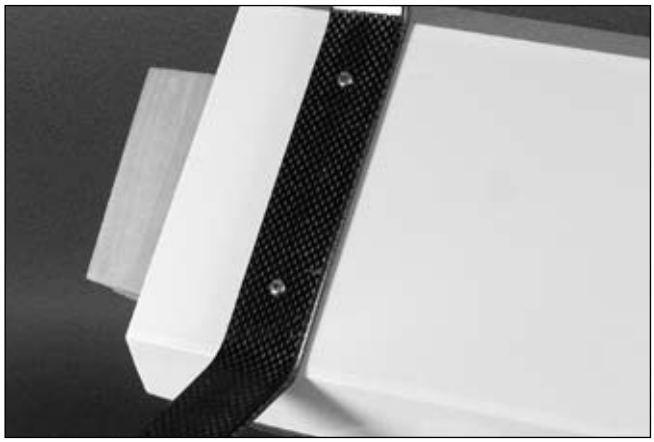
- Fuselage
- Landing gear
- 2 3/4" wheel (2)
- 1 1/4" axle w/nut (2)
- 4-40 blind nut (4)
- 8-32 x 3/4" screw (2)
- #4 washer (2)
- 4-40 x 1/2" socket head screw (4)
- 5/32" wheel collar w/setscrew (4)

Required Tools and Adhesives

- Phillips screwdriver
- Hobby knife
- Adjustable wrench (small)
- Hex wrench: 3/32"
- Drill
- Drill bit: 5/32" (4mm)

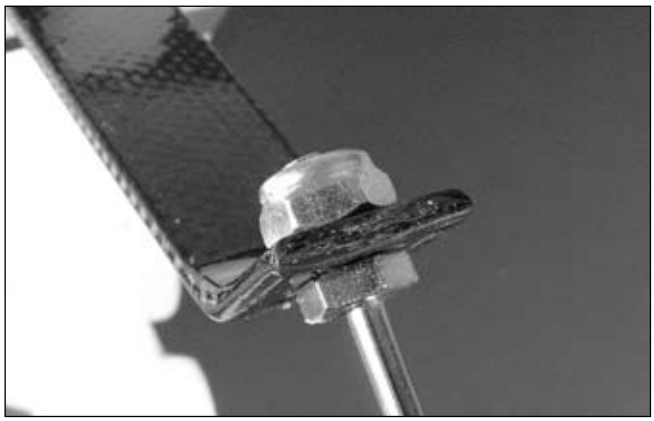
☐ Step 1

Install the landing gear using two 8-32 x 3/4" screws. Note that one edge of the gear is straight and the other is at a slight angle. The straight side faces forward.



☐ ☐ Step 2

Install an axle onto the landing gear. Secure the axle using an adjustable wrench and the nut provided with the axle.

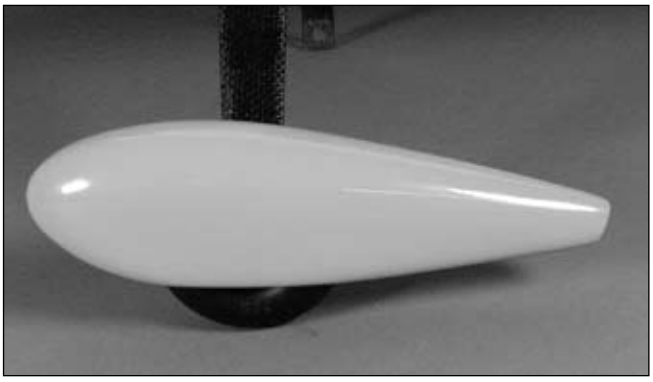


☐ ☐ Step 3

Attach the wheel to the axle using two 5/32" wheel collars and setscrews. Face the setscrews towards the bottom of the wheel pant so the position of the wheel can be adjusted once the wheel pant has been installed.

☐ ☐ Step 4

Place the airplane on the work surface. Slide the wheel pant into position. Adjust it so it won't interfere with the runway while the plane is at rest. Use a felt-tipped marker to mark the locations for the two screws through the landing gear.

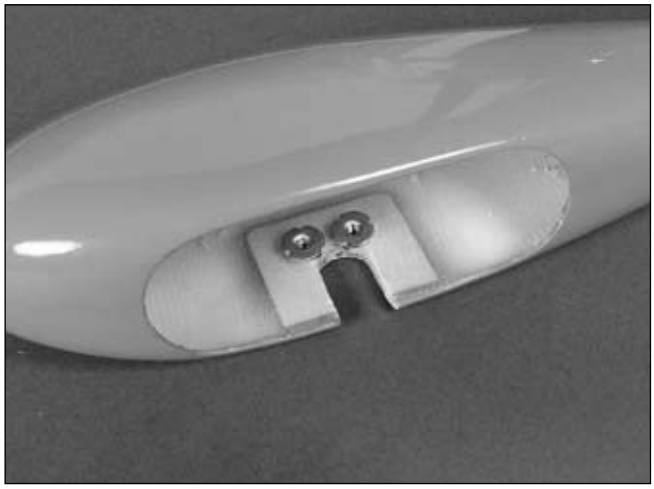


Section 6: Landing Gear Installation

Note: It may be necessary to open the notch in the wheel pant slightly to fit over the hex on the axle.

☐ ☐ Step 5

Drill the locations for the pant screws using a 5/32" (4mm) drill bit. Insert two 4-40 blind nuts into the holes from the inside of the wheel pant.

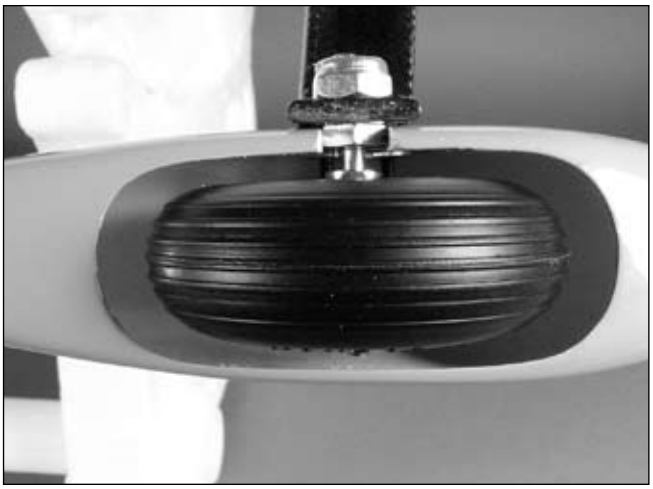


☐ ☐ Step 6

Attach the wheel pant to the landing gear using two 4-40 x 1/2" socket head screws.

☐ ☐ Step 7

Position the wheel so it is centered in the wheel pant. Tighten the collars once the wheel has been positioned.



☐ Step 8

Repeat Steps 2 through 7 for the other wheel pant.

Section 7: Engine Installation

Required Parts

- Fuselage assembly
- 8-32 x 1 1/4" screw (4)
- 8-32 locknut (4)
- Clevis
- Fuel tank assembly
- 16 3/8" (416mm) outer pushrod tube
- 18 5/8" (473mm) pushrod wire
- Engine mount (2)
- 8-32 x 1" screw (4)
- #8 washer (12)
- Clevis retainer

Required Tools and Adhesives

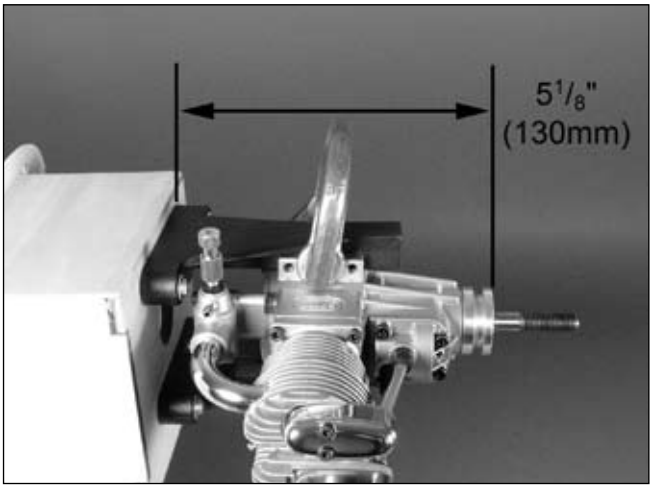
- Drill
- Pliers
- Phillips screwdriver (large)
- Medium CA
- Drill bit: 5/32" (4mm), 11/64" (4.5mm)
- Foam: 1/4" (6mm)
- Clamp
- Engine
- Sandpaper

☐ Step 1

Attach the engine mount to the firewall using four 8-32 x 1" screws and four #8 washers.

☐ Step 2

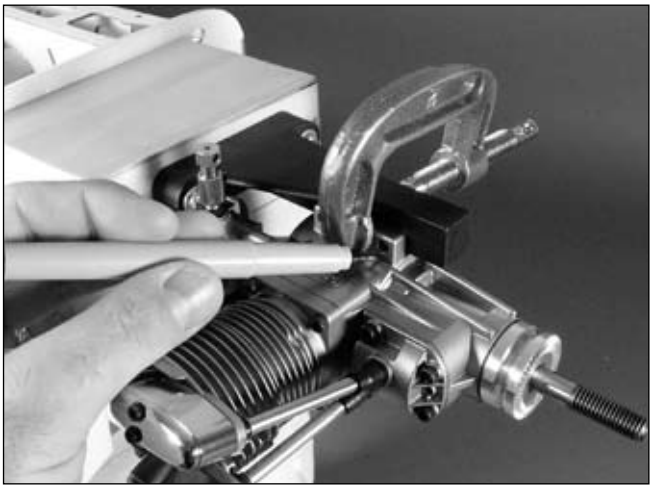
Position the engine on the mount. Adjust the engine so the distance from the firewall to the drive washer is 5 1/8" (130mm). Use clamps to hold the engine in position.



Note: Check to see which direction the needle valve is pointing. It should point towards the top of the aircraft. Remove the carburetor and rotate the carburetor so it faces the top if necessary.

☐ Step 3

Mark the locations for the engine mounting bolts.



Section 7: Engine Installation

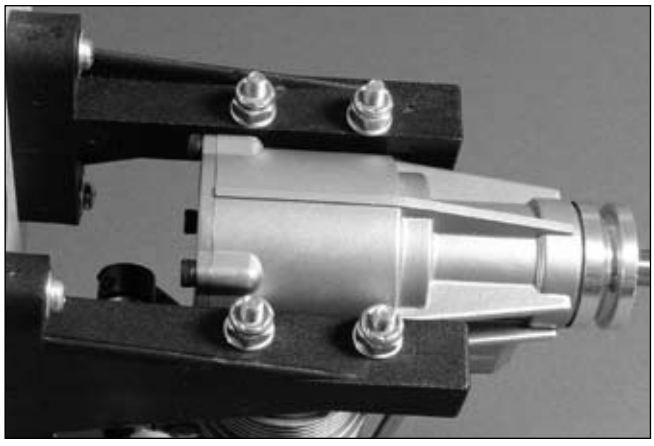
☐ Step 4

Remove the engine and drill the locations marked in the previous step using an 11/64" (4.5mm) drill bit.

Hint: Use a drill press for the best results. This makes holes perfectly perpendicular (square) to the mount.

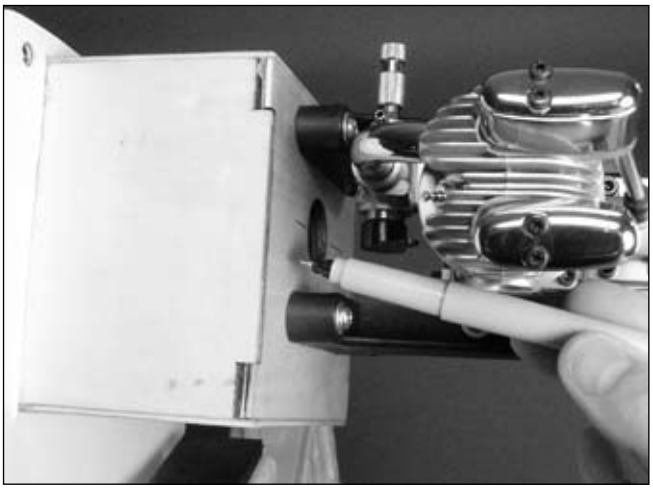
☐ Step 5

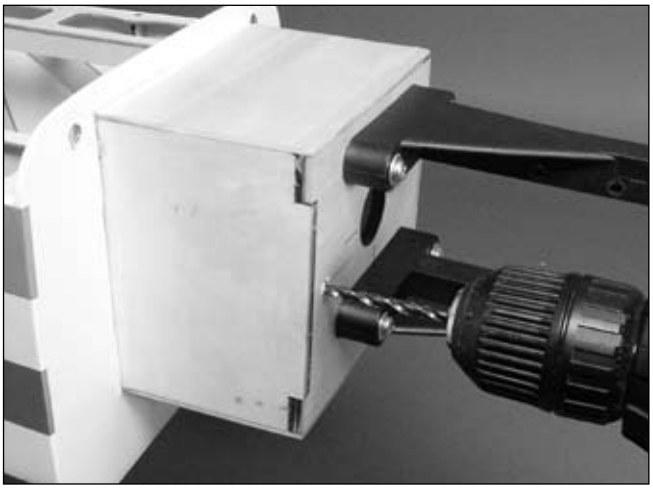
Attach the engine using four 8-32 x 1 1/4" socket head screws, eight #8 washers and four 8-32 locknuts.



☐ Step 6

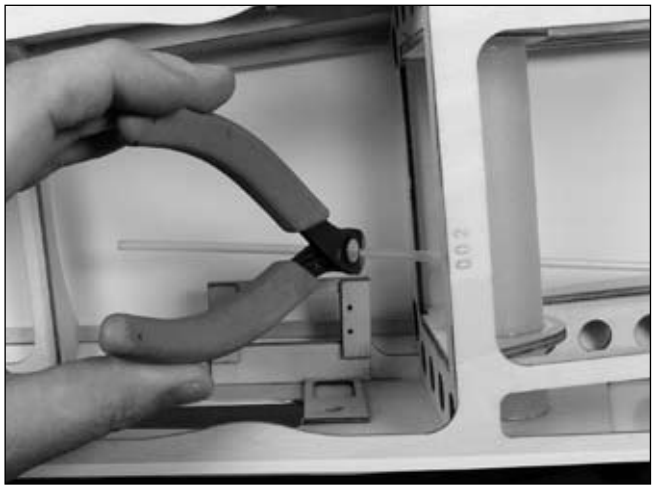
Determine the proper location for the throttle pushrod. Mark the location with a felt-tipped pen. Remove the engine and drill the firewall for the pushrod tube using a drill and 5/32" (4mm) drill bit.





☐ Step 7

Test fit the 16 3/8" (416mm) outer pushrod tube through the firewall and into the fuselage. Once satisfied with the fit, roughen the tube using sandpaper. Slide the tube back into position and use medium CA to glue it to the firewall. Allow 1/16" (1.5mm) of the pushrod to extend forward of the firewall. Trim the throttle pushrod at the front edge of the throttle servo tray.

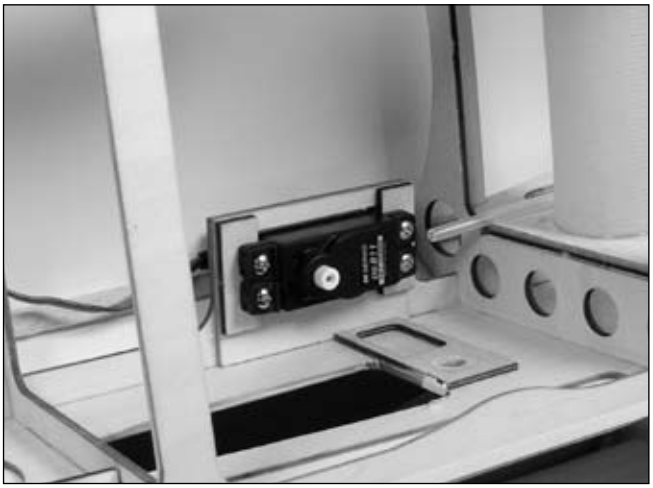


☐ Step 8

Slide a clevis retainer onto a nylon clevis. Thread a clevis onto the 18 5/8" (473mm) pushrod wire a minimum of 10 turns.

☐ Step 9

Install the servo hardware (grommets and eyelets) included with the servo. Mount the throttle servo with the output shaft towards the rear of the fuselage.



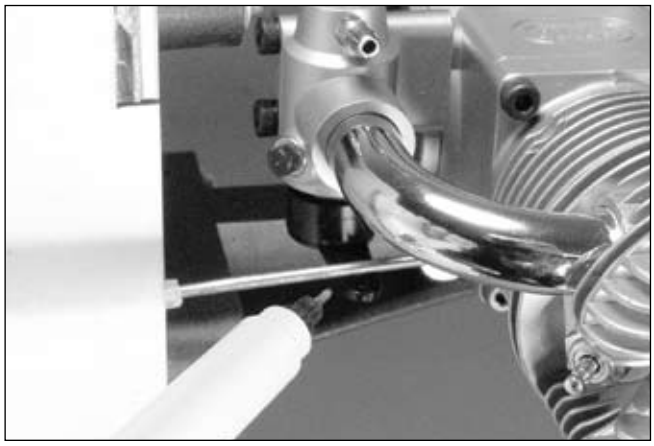
☐ Step 10

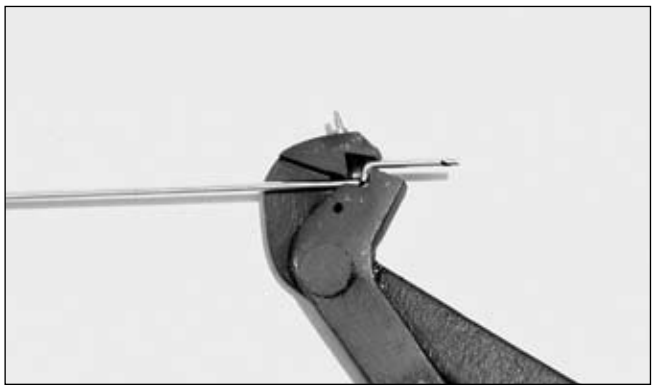
Slide the pushrod into place from inside the fuselage and attach the clevis to the servo arm.

Section 7: Engine Installation

☐ Step 11

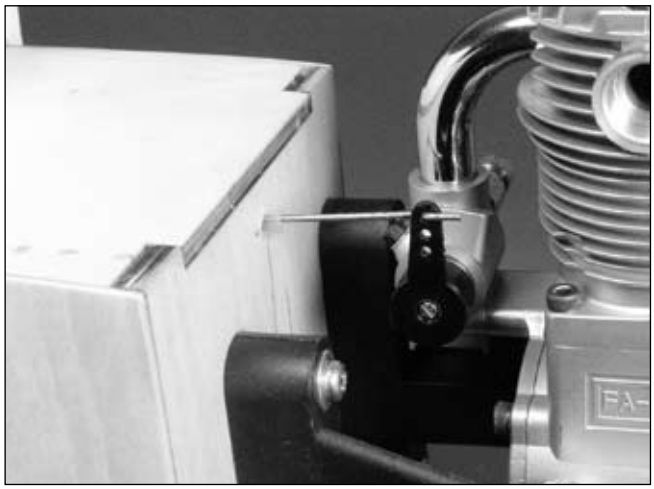
Move the carburetor to the half-throttle position. Mark the pushrod where it crosses the throttle arm using a felt-tipped pen. Remove the pushrod and make a “Z” bend in pushrod.





☐ Step 12

Remove the clevis from the pushrod. Slide the pushrod into the pushrod tube from the firewall. Attach the “Z” bend to throttle arm.



☐ Step 13

Thread the clevis back onto pushrod. Attach the clevis to the throttle arm. Move the throttle to full throttle using the radio. Check the carburetor to make sure it is fully open. Adjust the clevis to correspond full throttle on the radio to full throttle on the carburetor. Use the radio to check low for idle and closed. Move the linkage at the carburetor arm and servo arm as necessary for full range of operation.

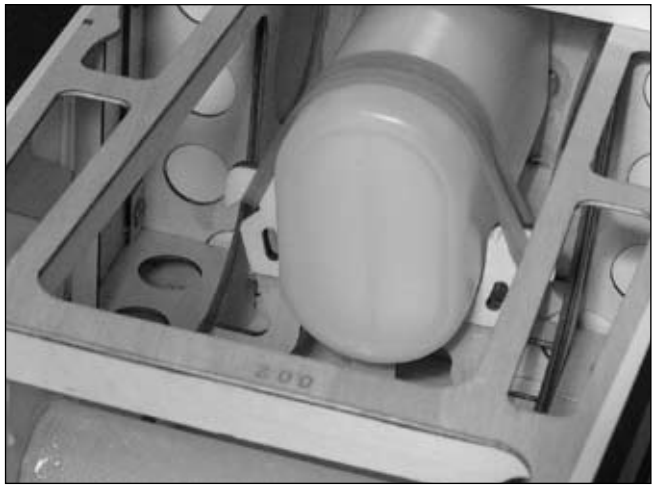
☐ Step 14

Locate the fuel tank. Determine which fuel line is the vent line by looking at the top of the fuel tank. Make a note as to which side the vent line is located.

> **Note**: The stopper on the tank is towards the top of the tank.

☐ Step 15

Glue a strip of 1/4" (6mm) foam onto the fuel tank support. Use two rubber bands to secure the fuel tank in position.



☐ Step 16

Attach the muffler to the engine. Make the proper connections to the engine using the engine manufacturer’s instructions.

Section 8: Cowling Installation

Required Parts

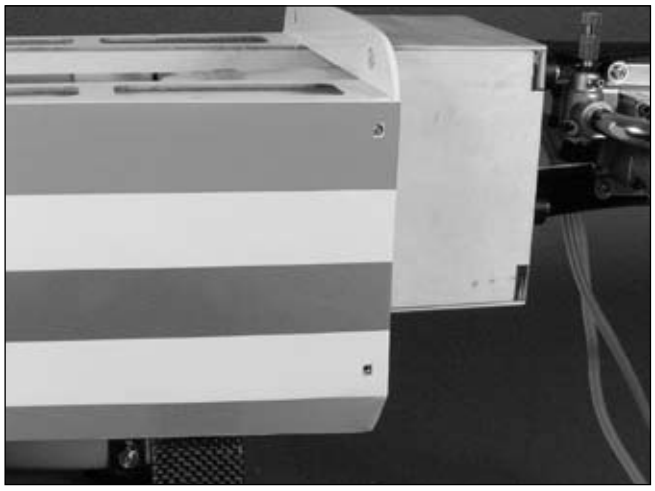
- Fuselage assembly
- Cowling
- #4 washer (4)
- 4-40 x 1/2" socket head screw (4)

Required Tools and Adhesives

- Hex wrench: 3/32"
- Hobby scissors
- Hobby knife
- Ruler
- Drill
- Drill bit: 1/8" (3mm)

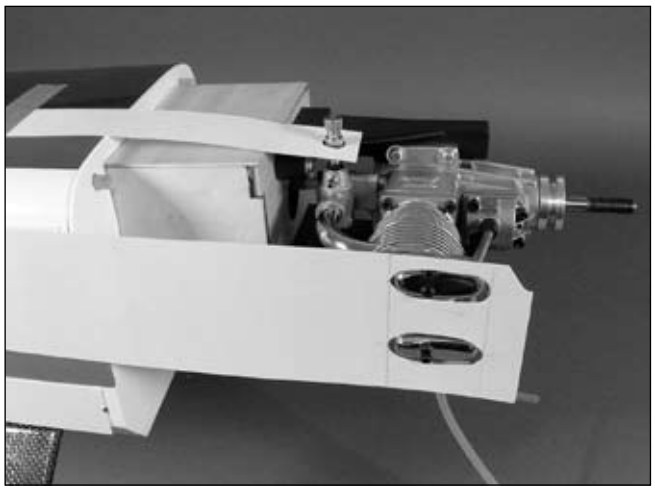
☐ Step 1

Locate the pre-installed blind nuts at the front of the fuselage. Remove the covering so the blind nuts can be accessed.



☐ Step 2

Use pieces of cardstock to indicate the location of the engine and screw locations for the cowling.



Hint: You may want to place the canopy hatch onto the fuselage so you can tape the cardstock into position to locate the needle valve.

☐ Step 3

Remove the engine. Position the cowl onto the fuselage so it is 5" (127mm) from the firewall. Transfer the location for only the engine onto the cowl.

☐ Step 4

Remove the cowl and remove the necessary material to fit the cowl over the engine. Install the engine back onto the firewall, and test fit the cowl over the engine.

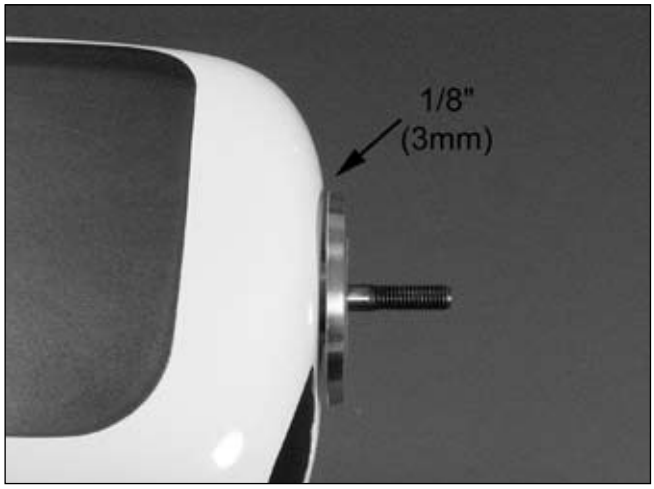
Hint: Start by removing only a little material at a time. You can always make the holes bigger, but you can't make them smaller. Work until the cowl fits nicely over the engine.

Section 8: Cowling Installation

Note: Remember to either trim material from the cowl to attach the glow igniter, or use a remote glow connection.

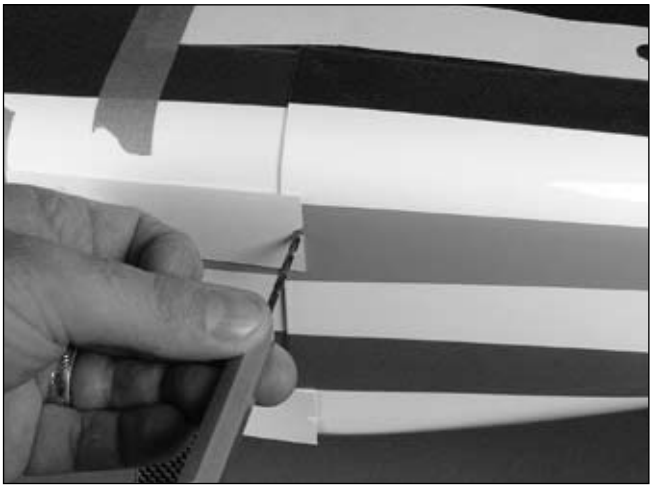
☐ Step 5

Slide the cowling onto the fuselage. Temporarily install the propeller and spinner backplate. Position the cowl so there is 1/8" (3mm) gap between the backplate and the cowl.



☐ Step 6

Use the cardstock from Step 1 to locate the positions for the cowling screws. Drill the locations using a 1/8" (3mm) drill bit.



☐ Step 7

Make any cutouts in the cowling to clear items such as the muffler, fueling valve, needle valve, etc.

☐ Step 8

Locate four 4-40 x 1/2" socket head screws and four #4 washers. Slide the washers onto the screws, and then cut a small 1/4" (6mm) piece of fuel tubing to slide onto the screws. Attach the cowling using the four screws.

Section 9: Final Assembly

Required Parts

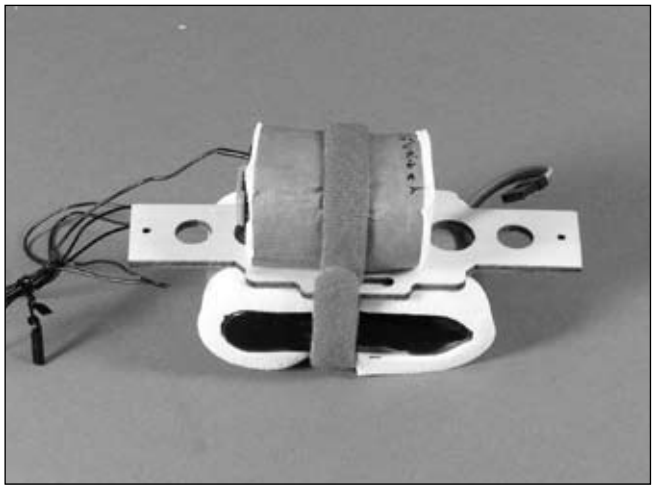
- Side force generator (2)
- Fuselage
- Hatch
- Canopy
- 4-40 x 1/2" screw (8)
- #4 washer (8)
- Decals
- Pilot
- #2 x 1/2" sheet metal screw (2)

Required Tools and Adhesives

- Plywood
- Medium CA
- Hobby knife
- Receiver
- Radio switch harness
- Receiver battery
- Shoo Goo
- Masking tape
- Hex wrench: 3/32"
- Drill
- Drill bit: 3/32" (2.5mm)
- Canopy glue

☐ Step 1

Wrap the receiver and receiver battery in protective foam to prevent damage that may be caused by engine vibration. Attach the battery and receiver to the plywood tray.



☐ Step 2

Secure the radio tray into the fuselage using two #2 x 1/2" sheet metal screws. It may be necessary to shift the battery forward or aft to balance the model as described in the section “Center of Gravity.” Plug in any servo leads or extensions at this time and connect any extensions necessary for the aileron servos.

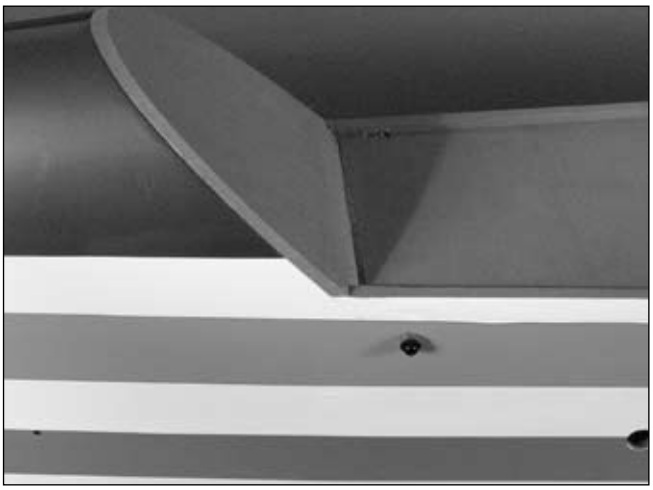
Section 9: Final Assembly

☐ Step 3

Route the antenna out through the tube in the fuselage. Mount the radio switch in the side of the fuselage.

☐ Step 4

Remove the covering to expose the holes for the hatch hold-down screws. Slide a #4 washer onto a 4-40 x 1/2” socket head screw. Cut a 1/4" (6mm) piece of tubing to slide onto the screw. Attach the hatch using two of these screws.

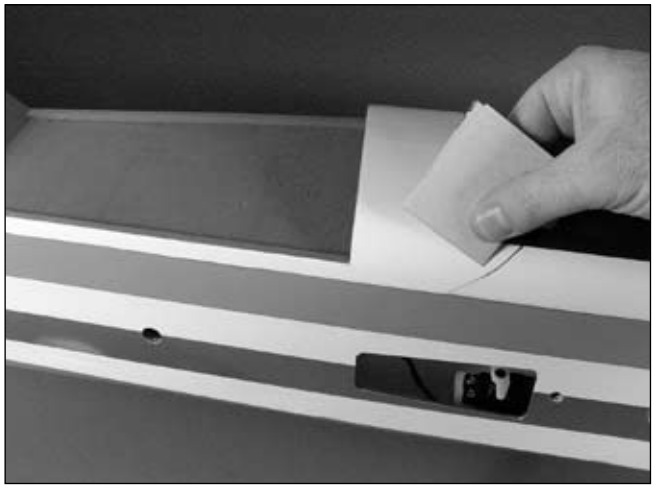


☐ Step 5

Position the canopy onto the canopy hatch. Trace around the canopy and onto the hatch using a felt-tipped pen.

☐ Step 6

Lightly sand the inside edge of the canopy and slightly inside the line drawn on the hatch using medium sandpaper.



☐ Step 7

Apply a bead of canopy glue around the inside edge of the canopy. Position the canopy onto the hatch. Use tape to hold the canopy secure until the glue fully cures. Don't get glue on the fuselage, accidentally gluing the canopy to the fuse.

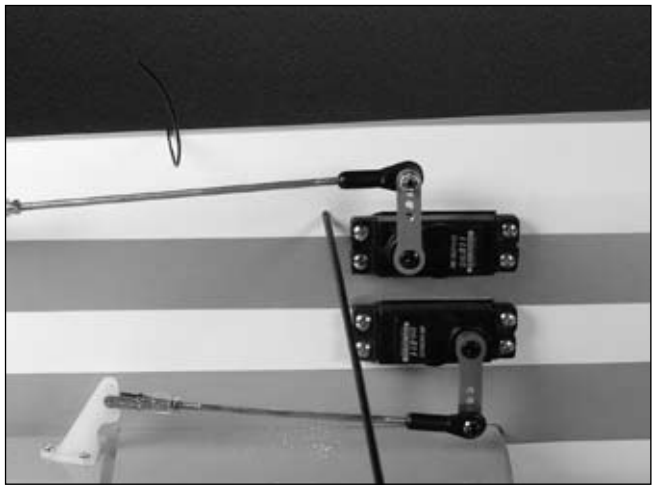
☐ Step 8

Apply the decals using the photos on the box as a guide.

> **Note**: Do not omit the following steps. The tail supports are required to assure the stabilizer will not break during high-stress maneuvers.

☐ ☐ Step 9

Locate one of the carbon fiber tail support rods. Determine the location of the rod near the rudder servo so it will not interfere with the servo arm. Drill a 3/32" (2.5mm) hole at the location selected.



☐ ☐ Step 10

Drill a 3/32" (2.5mm) hole in the stabilizer as shown. Trim the length of the carbon rod so it fits between the two locations.

Section 9: Final Assembly

☐ ☐ Step 11

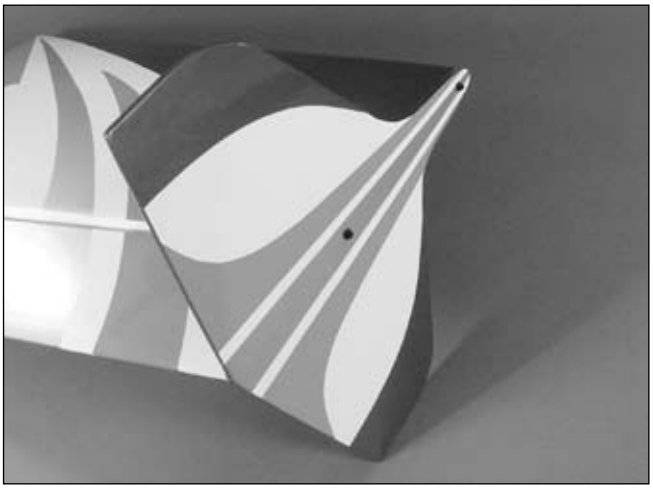
Lightly sand the ends of the rod using medium sandpaper. Use 30-minute epoxy to glue the rod into position.

☐ Step 12

Repeat Steps 9 and 11 for the remaining support rod.

☐ Step 13

Attach the side force generator using two #4 washers and two 4-40 x 1/2" socket head screws.



Note: The side force generators can be removed in a few seconds. Try your FuntanaX 100 with and without them to decide which setup suits your flying style best.

Center of Gravity

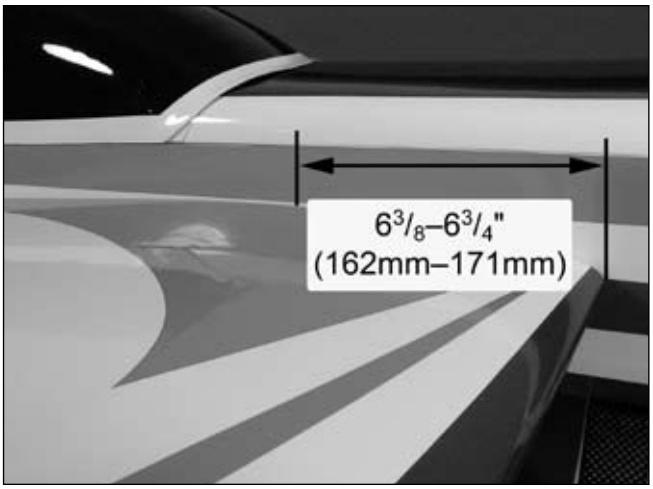
An important part of preparing the aircraft for flight is properly balancing the model. This is especially important when various engines are mounted.

Caution: Do not inadvertently skip this step!

The recommended Center of Gravity (CG) location for the FuntanaX 100 is 6 3/8"–6 3/4" (162mm–171mm) behind the leading edge of the wing against the fuselage.

Note: The CG can also be measured at the wing tip. This measurement is 3 1/8"–3 1/2" (79mm–89mm) behind the leading edge of the wing.

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.



Control Throws

Setting the control throws for your Funtana does require some attention to detail. To correctly set the throws, it is highly suggested to use the following procedure to achieve the greatest mechanical advantage from your servos.

☐ Step 1

Determine the maximum amount of control surface throw from the throws listed. Use the 3D throws listed to set the maximum amount of throw, then use your computer radio for the lower rate listed.

☐ Step 2

Set the Travel Adjust (ATV on a Futaba transmiter) to about 15% under the max. (On a JR® transmitter, that is 135%.) Make sure to set both directions during this process.

☐ Step 3

Adjust the position of the clevis on the control horn and position of the ball link on the servo arm to achieve the throw decided in Step 1. It is highly recommended not to change the position on the servo arm unless absolutely necessary. Use Travel Adjust (ATV) to finalize the throws. That is why we left a little margin in the percentages back in Step 2.

☐ Step 4

If setting a dual elevator or aileron, match the linkage locations used back in Step 3. Increase or decrease the Travel Adjust (ATV) a few points as necessary to fine-tune the throws to match up left and right sides and up and down throws so all is symmetrical.

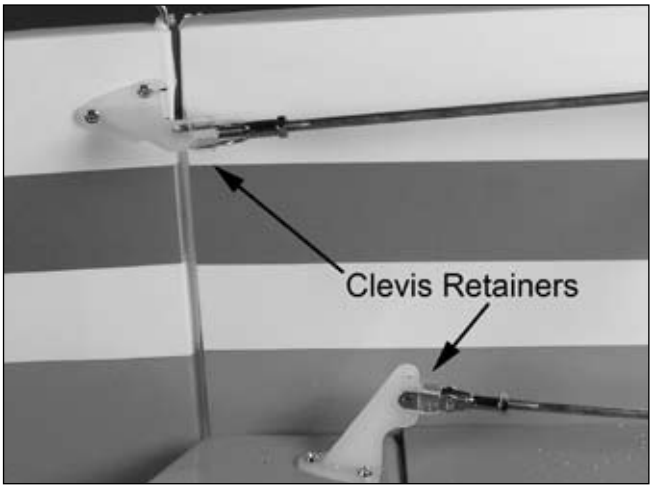
This is all necessary to tune the mechanical advantage as good as possible. When setting up a model for 3D, the mechanical advantage will be less because of the large throws, and thus the servo will work harder and wear faster. Using an insufficient servo for the job, or trying to get too much throw, will cause something to give, probably the servo.

There isn't an exact geometry to the linkage, as it depends on how much throw each individual modeler requires. The linkage geometry should always be maximized so the servo isn't working any harder than it has to.

	Low rate	**3D rate**
Aileron		
	17° up	34.5° up
	17° down	34.5° down
Elevator		
	11.5° up	50° up
	13° down	51° down
Rudder		
	24° right	52° right
	24° left	52° left

Note: Control throws are measured at the widest part of the elevator, rudder, and aileron unless noted otherwise.

Once the control throws have been set, use the supplied heat shrink tubing on each clevis to prevent them from opening during flight.



Rates and Expos

Use Expo to soften the feel of the model. On high 3D rates, use quite a bit of expo. The goal on 3D rates is to get the model to feel the same around neutral as it does on low rates.

Use low rate settings for all flying except for 3D aerobatics. For precision flying or general sport hot-dogging, the low rate throws are perfect, even for snap rolls. The only exception is rudder rates. Use 3D rudder rate when doing stall turns and rolling circles, since the more rudder the better for these. When doing 3D aerobatics, flip to 3D rates just before the maneuver. As soon as the maneuver is done, flip back down to low rate to avoid over-controlling the model.

Radio Setup

A 7-channel or greater computer radio is highly recommended. This allows the following features:

- Mixing the right aileron to the left aileron (flaperon mix)
- Electronically adjustable aileron differential
- Mixing the right elevator to the left elevator (dual elevator mixing)
- Independent travel and trim adjustments for each elevator half

When using a 7-channel or greater computer radio, each servo is plugged into its own separate channel. Consult your radio manual for specific details on hookup and programming.

If using a 6-channel radio with flaperon mix, the aileron servos are each plugged into their own channels. The right aileron plugs into the aileron socket in the receiver, while the left aileron plugs into channel 6. With flaperon activated in the programming, this allows for independent travel adjustment of each aileron in each direction and electronic aileron differential. Consult your manual for more programming details.

With a 6-channel computer radio, it will be necessary to Y-harness the two elevator servos; a reversed elevator servo is needed to achieve the correct control direction. A servo reverser can be used here. Special attention must be taken with the rudder servos so that they don't fight each other throughout the rudder travel. This is caused by nonsymmetrical pushrod geometry from right to left. It may be necessary to rotate the arm on the servo one or two splines (most of the time toward the rear) and readjust the linkage length in order to prevent binding.

Using a non-computer radio will require that the aileron, elevator and rudder be Y-harnessed. Be sure to use a reversed servo (or a reverser) for one of the elevator servos. Special attention must be taken with the rudder servos so that they don't fight each other throughout the rudder travel. This is caused by non-symmetrical pushrod geometry from right to left. It may be necessary to rotate the arm on the servo one or two splines (most of the time toward the rear) and readjust the linkage length in order to prevent binding. If you've ever thought about purchasing a computer radio, now is a good time to do it!

Range Test Your Radio

☐ Step 1

Before each flying session, be sure to range check your radio. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the receiver in your airplane. With your airplane on the ground and the engine running, you should be able to walk 30 paces (approximately 100 feet) 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.

☐ Step 2

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

☐ Step 3

Be sure that your batteries are fully charged, per the instructions included with your radio.

Preflight

For those of you who are veterans of large models, this is old news. But to you newcomers to the world of large models, this is very important information.

While many smaller models are very tolerant of improper control linkage setups and flying techniques, large models are not. Don't let that scare you away from large models; they are truly one of the best flying experiences in RC that money can buy. However, please pay particular attention to the following areas.

Seal the aileron and elevator hinge gaps.

This should be considered part of finishing the model, and is as important as installing the fuel tank or battery pack. On large aerobatic models, this is absolutely necessary.

Failure to do this can cause control surface flutter, and on a large model, this will most likely cause a crash.

Putting safety and model preservation to the side, there are several other reasons to do this on an aerobatic model. It will increase the effectiveness of the control surfaces, and the model will track more true and precise.

Maintain the proper mechanical advantage on all control surface linkages.

Just as with unsealed hinge gaps, mechanical advantage is often another cause of flutter. Please follow the control horn and servo arm lengths recommended in this manual. Shorter arms on the servo or longer control horns on the elevator and ailerons are fine, but do not try to go the other way to increase throw. It can cause flutter on the FuntanaX 100. The recommended linkage setups are more than adequate to achieve full 3D throws.

Never attempt to make full throttle dives!

Large models perform much more like full-size aircraft than small models. If the airframe goes too fast, such as in a high throttle dive, it may fail. The FuntanaX 100 should be flown like a full-scale Katana. Throttle management is absolutely necessary.

Computer Radio Enhancements

A computer radio will allow you to do quite a bit of fine-tuning to the feel of the FuntanaX 100, which will make aerobatics even easier.

Notes

Notes

2006 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.)

2006 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.

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