HANGAR 9®
Fly First Class™

Ultra Stick™ 40 ARF
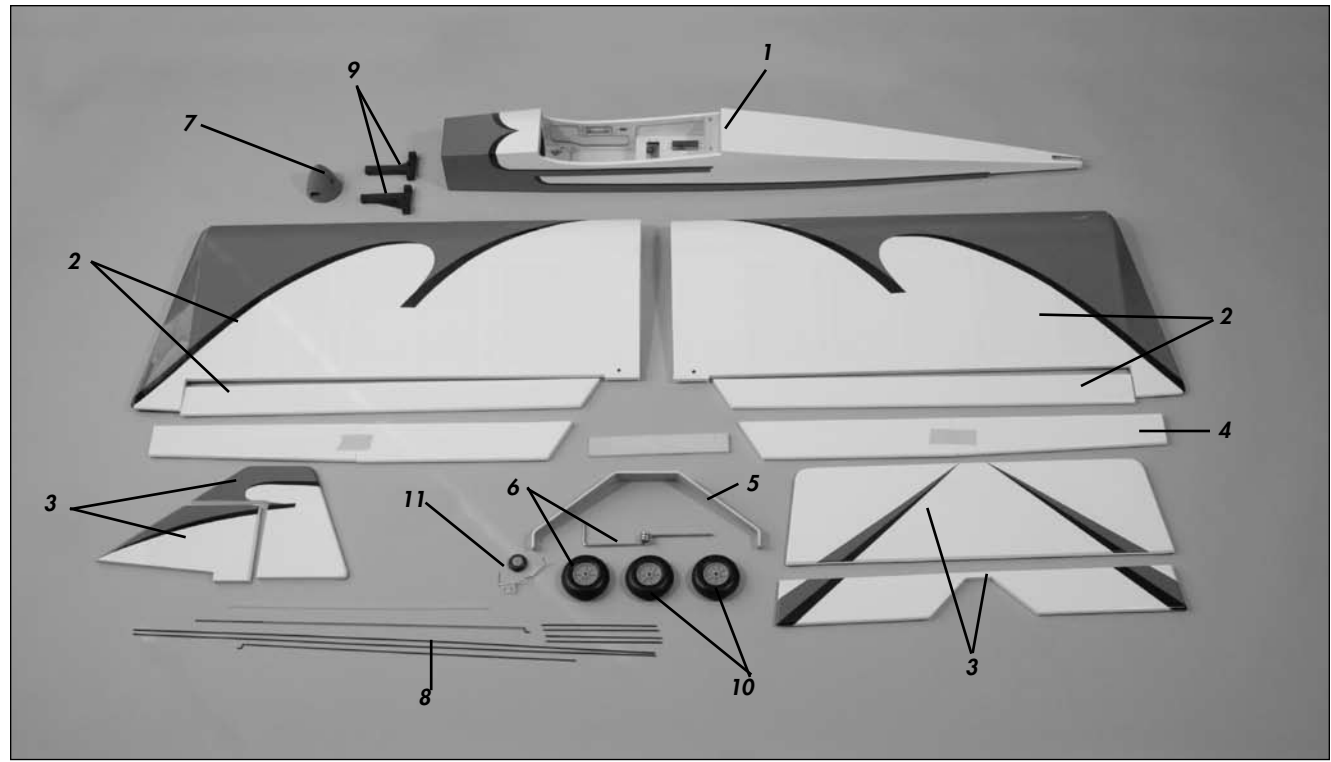### Assembly Manual

Specifications

Wingspan: ....57.75 in (1467mm)
Length: ....51 in (1295mm)
Wing Area: ....700 sq in (715 with quad flaps)
Weight: ....5–6 lb (2.3–2.7 kg)
Radio: ....4-channel or greater
Engine: ....40–.46 2-stroke, .56–.82 4-stroke

Table of Contents

Contents of Kit and Parts Layout

Large Replacement Parts

1.	HAN173001	Fuselage
2.	HAN173002	Wing Set with Standard Ailerons
3.	HAN173003	Tail Set
4.	HAN173004	Quad Flaps
5.	HAN173005	Aluminum Main Landing Gear
6.	HAN173006	Nose Wheel Strut with Wheel
7.	HAN173007	Spinner 2$\frac{1}{4}$-inch, Red
8.	HAN173009	Pushrod Set
9.	HAN173010	Engine Mount
10.	HAN173013	Wheels 2$\frac{1}{2}$-inch (2)
11.	HAN4709	Tail Wheel Assembly

Small Replacement Parts (not shown)

HAN173008	Decal Sheet
HAN173011	Fuel Tank 11 oz (320cc)
HAN173012	Wheel Axles

Included Parts Listing

PCKAGED IN BOX

Fuselage	(1)	
Right wing with aileron	(1)	
Left wing with aileron	(1)	
Horizontal stabilizer with elevator	(1)	
Vertical fin with rudder	(1)	
Right quad flap set	(1)	
Left quad flap set	(1)	

LINKAGES AND CONTROL HARDWARE

Nylon clevis	(6)	Ailerons, flaps, rudder and elevator
90-degree snap link	(6)	Ailerons, flaps, rudder and elevator
Clevis retainer tubing	(6)	Ailerons, flaps, rudder and elevator
CA hinges	(16)	Ailerons, flaps, rudder and elevator
2mm x $27^1/_2$-inch pushrod	(2)	Elevator and rudder
2mm x 6-inch pushrod	(4)	Aileron and flap
Pushrod guide tube	(2)	Throttle and steering
2mm x 16mm machine screw	(12)	Control horns
Nylon control horn with backplate	(6)	Ailerons, flaps, rudder and elevator
Pushrod support tab	(1)	Nose wheel pushrod support

FUEL TANK

11 oz (320cc) fuel tank	(1)	
Silicone fuel line (red, green, clear)	(1)	Fuel tank
Tank stopper	(1)	Fuel tank
Metal backing plate disk	(2)	Fuel tank
3mm machine screw	(1)	Tank
Clunk	(1)	
Aluminum tubing	(3)	Vent, fill and overflow
Balsa block	(1)	Fuel tank

LANDING GEAR

4mm wheel axles	(2)	Main wheels
8-32 x 5/8-inch Phillips machine screw	(2)	Landing gear to fuselage
#8 flat washer	(2)	Landing gear to fuselage
Pushrod connector with back and setscrew	(2)	Throttle and steering
1.5mm x $17^3/_4$-inch pushrod	(2)	Throttle & steering
Aluminum landing gear	(1)	Main landing gear
$2^1/_2$-inch (64mm) rubber wheels	(3)	Main landing gear and nose wheel option
Tail wheel wire with nylon bracket	(1)	
1-inch wheel	(1)	Tail wheel
2mm wheel collar	(1)	Tail wheel
4mm wheel collar	(8)	Main landing gear and nose gear
4mm nose gear wire strut	(1)	Tricycle gear option
Nose gear steering arm	(1)	Tricycle gear option

ENGINE MOUNT

Nylon engine mount	(2)	
$2^1/_4$-inch red plastic spinner with screws	(1)	
#8 silver flat washers	(4)	Engine to mount and mount to firewall
8-32 x 1-inch socket head screws	(4)	Motor mount to firewall and engine to mount
6-32 x 1 in socket head screw	(4)	Engine to mount
6-32 lock nuts	(4)	Engine to mount
#6 Flat washer	(4)	Engine to mount

WING ASSEMBLY AND INSTALLATION

Nylon 1/4-20 x $1^1/_2$-inch wing bolts	(2)	Wing to fuselage
Wing bolt washer plate	(1)	
2 x 1/4-inch dowel rods	(2)	Anti-rotation pins
Hardwood wing spar	(1)	
1-inch white covering strip	(1)	Center wing joint

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.

Important Information Regarding Warranty Information

Please read our Warranty and Liability Limitations section on Page 45 before building this product. 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.

UltraCote® Covering Colors

• Black	HANU874
• White	HANU870
• True Red	HANU866

Before Starting Assembly

Before beginning the assembly of your model, 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 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 – Sealing Iron

HAN141 – Sealing Iron Sock

Radio System Requirements

Spektrum Radio System (recommended)

- DX6i 6-channel radio or greater with receiver (SPM6600)
- DS821 Digital Sport Servo (5) (JRPS821)
- Y-Harness (JSP98020) or 3-inch Servo Extension (2) (JSP98100) for receiver to aileron servo extensions
- Receiver Battery, 2300mAh 5-cell (JRPB5006)
- JR Switch, Chargeswitch (JRPA004)

Optional Items for Quad Flaps Installation

- DS821 Digital Sport Servo (JRPS821)
- DS821 Digital Sport Servo, Reverse (JRPS821R)
- 3-inch Servo Extension (2) (JSP98100) for receiver to servo extensions
- 9-inch Servo Extension (2) (JRPA097) for servo to servo extensions inside wing

Recommended Setup–2-Stroke Glow

- Evolution® .46NX with Muffler (EVOE0461)
- Evolution Propeller 11 x 5 (EVO11050) or 11 x 6 (EVO11060)
- Exhaust Diverter (DUB697) (optional)

Recommended Setup–4-Stroke Glow

- Saito™ .82 AAC with Muffler (SAIE082A or SAIE082AGK)
- Evolution Propeller 13 x 8 (EVO13080) or 14 x 6 (EVO14060)
- Exhaust Diverter (DUB697) (optional)

Field Equipment Required

- Fuel (15% recommended)
- Propeller
- Long Reach Glow Plug Wrench (HAN2510)
- Metered Glow Driver with Ni-Cd & Charger (HAN7101)
- 2-Cycle Sport Plug (EVOGP1)
- Manual Fuel Pump (HAN118)

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Optional Field Equipment

- Selfstick Weights, 6 oz (HAN3626)
- PowerPro 12V Starter (HAN161)
- 12V 7Ah Sealed Battery (HAN102)
- Power Panel (HAN106)
- Blue Block After Run Oil (EVOX1000)
- Cleaner and towels

Tools and Supplies

Drill	Epoxy brush
Felt-tipped pen	Hook and loop tape
Hobby knife with #11 blade	Low-tack tape
Sandpaper	Mixing cup
Mixing stick	Paper towel
Phillips screwdriver: #1, #2	Pencil
Pin vise	Pliers
Rotary tool	Rubbing alcohol
Ruler	Diagonal cutters
String	Threadlock
T-pin	Sanding drum

Foam rubber, 1/4-inch (6mm)

Nut driver or box wrench: 1/4-inch

Box wrench to fit propeller nut

Box end or open end wrench: 10mm (2)

Hex wrench or ball driver: 1.5mm, 2.5mm, 3/32-inch, 9/64-inch

Drill bit: 1/16-inch (1.5mm), 5/64-inch (2mm), 1/8-inch (3mm), 5/32-inch (4mm), 11/64-inch (4.5mm), 7/32-inch (5.5mm)

Additional Required Adhesives

30-Minute Epoxy	(HAN8002)
Medium CA	(PAAPT02)
Thin CA	(PAAPT08)

Aileron Installation (Aileron Only)

Required Parts

    Wing panel (right and left)

    Aileron, full length (right and left)

    CA hinge (8)

Tools and Adhesives

    Drill bit: 1/16-inch (1.5mm)   Pin vise

    Hobby knife with #11 blade   Thin CA

Note: There are two wing configurations for your model, standard two ailerons and quad flaps (ailerons with flaps). This section covers the installation of the ailerons for the two aileron versions of your model.
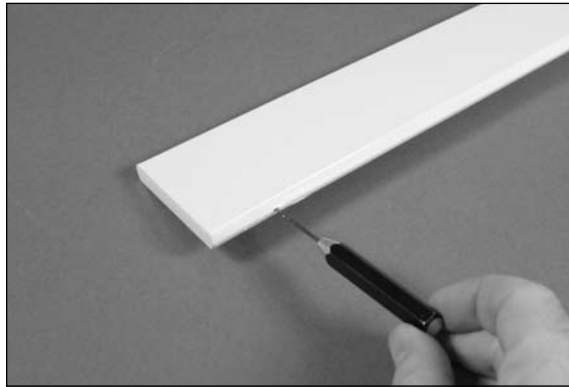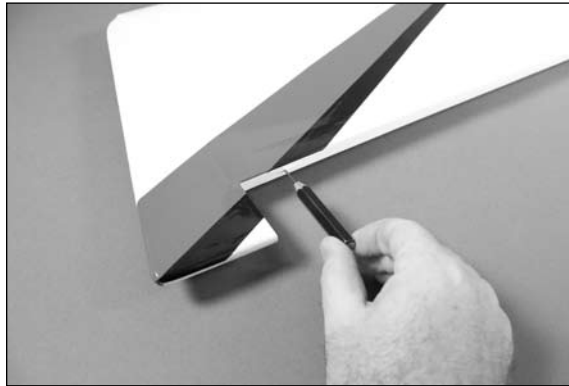
☐☐ Step 1

Check to make sure you have the correct aileron. The trim will match the bottom of the wing.
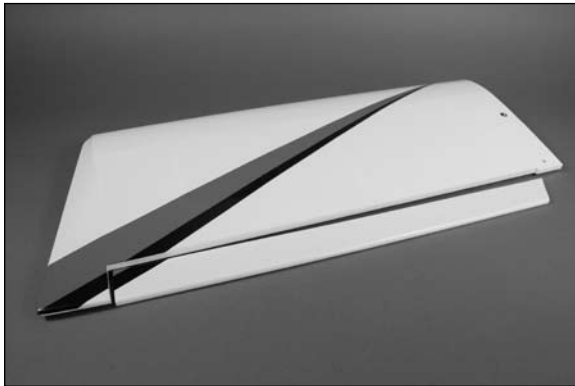
☐☐ Step 2

Use a pin vise and 1/16-inch (1.5mm) drill bit to drill a hole in the center of each hinge slot. Drill holes for both the aileron and wing.

☐☐ Step 3

Place a T-pin in the center of each hinge. Insert the hinges in the slots in the trailing edge of the wing. Try to align the slot in the hinge with the hole drilled in the previous step.

□□ Step 4

Use the hinges to place the aileron in position. Use a hobby knife to set the gap between the control surface and the wing. Also check that the aileron can move freely without rubbing at the wing tip.
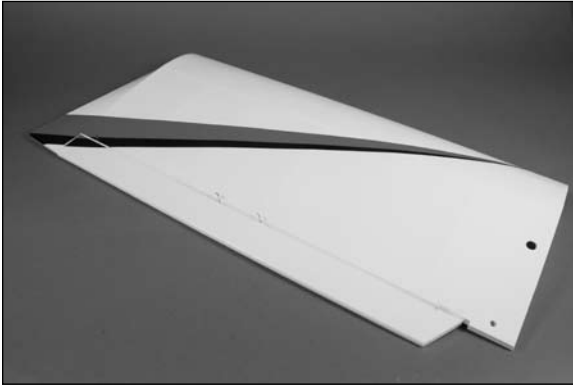

□□ Step 5

Saturate each of the hinges with thin CA. Make sure to glue both the top and bottom. Once the CA has cured, gently pull on the aileron to make sure the hinges are secure. If not, apply more CA to the loose hinge.
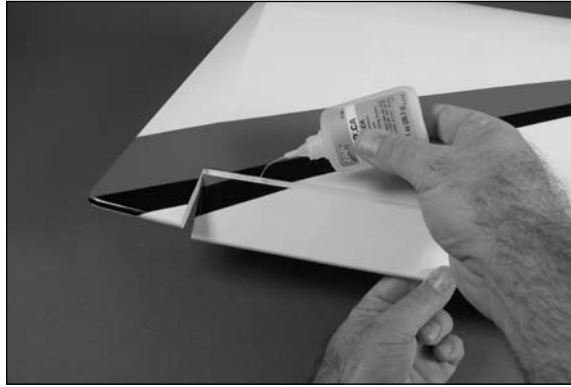
Note: Do not use CA accelerator on the hinges. The CA must be allowed to soak into the hinge and surrounding wood.

□□ Step 6

Flex the aileron up and down a number of times to break in the aileron hinges.
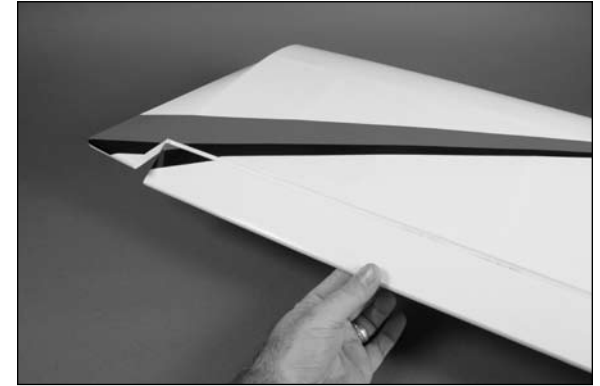
□ Step 7

Repeat Steps 1 through 6 to install the remaining aileron.

Aileron and Flap Installation
(Quad Flap Only)

Required Parts

Wing panel (right and left)   Aileron (right and left)
Flap (right and left)   CA hinge (8)

Tools and Adhesives

Drill bit: 1/16-inch (1.5mm)   Pin vise
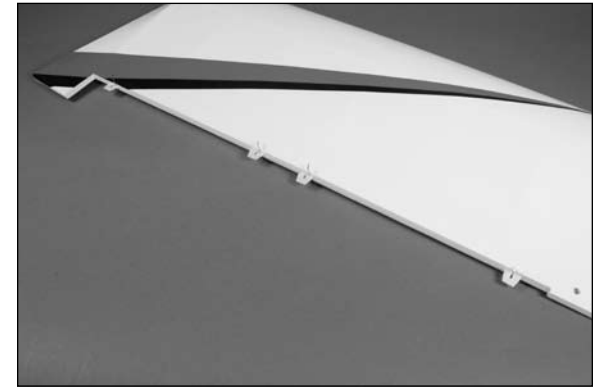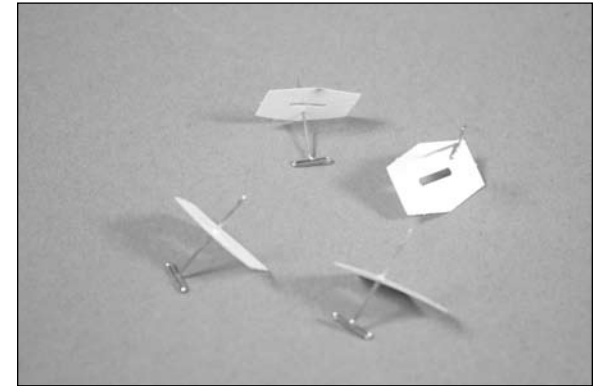Hobby knife with #11 blade   Thin CA

☐☐ Step 1

Check to make sure you have the correct aileron. The trim will match the bottom of the wing.

Note: The flap and aileron have not been seperated at this time and are still taped together as shipped.

☐☐ Step 2

Use a pin vise and 1/16-inch (1.5mm) drill bit to drill a hole in the center of each hinge slot. Drill holes for both the aileron and wing. Also prepare the flap at this time.
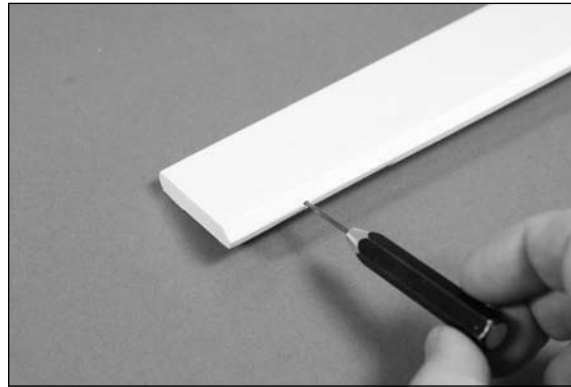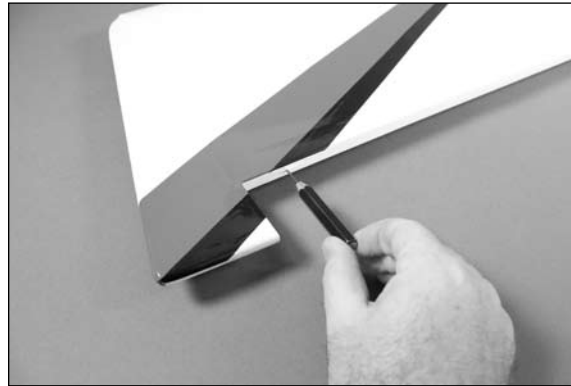

☐☐ Step 3

Place a T-pin in the center of each hinge. Insert the hinges in the slots in the trailing edge of the wing. Try to align the slot in the hinge with the hole drilled in the previous step.

☐☐ Step 4

Use the hinges to place the aileron in position. Use a hobby knife to set the gap between the control surface and the wing. Also check that the aileron can move freely without rubbing at the wing tip.
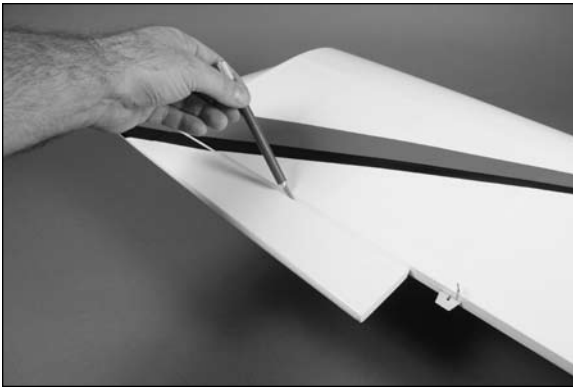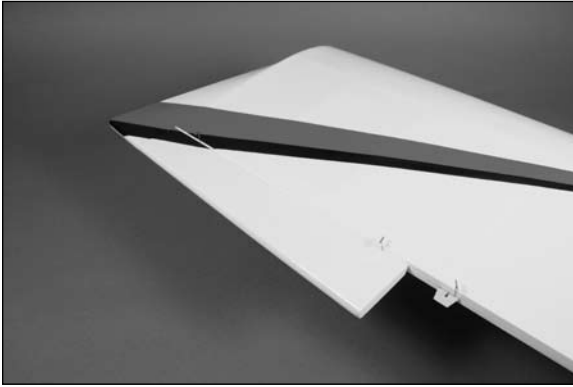
☐☐ Step 5

Saturate each of the hinges with thin CA. Make sure to glue both the top and bottom. Once the CA has cured, gently pull on the aileron to make sure the hinges are secure. If not, apply more CA to the loose hinge.
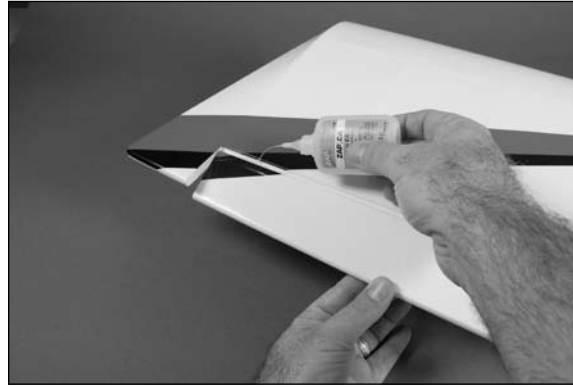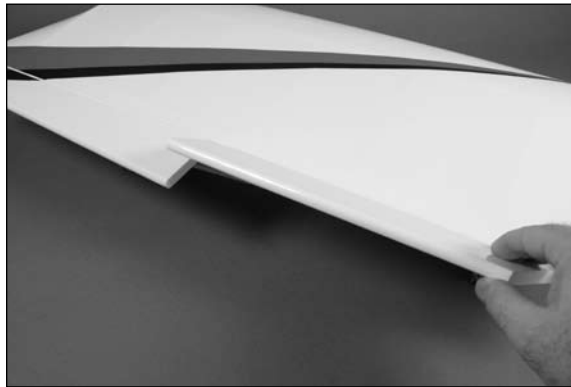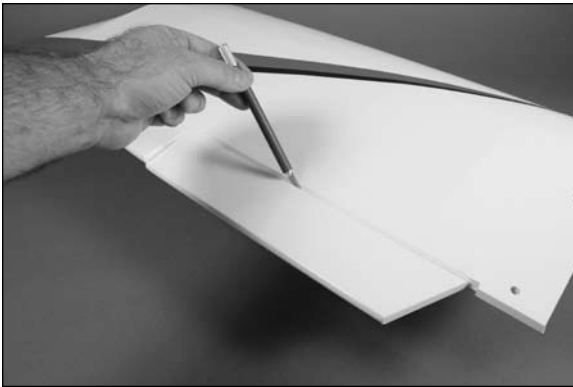

☐☐ Step 6

Flex the aileron up and down a number of times to break in the aileron hinges.

Step 7

Installing the flap follows the same procedure as the aileron. Position the flap, check the gap and that it doesn't hit the aileron and apply CA. Make sure to check the hinges and break them in.

Step 8

Repeat Steps 1 through 7 to attach the remaining aileron and flap to the wing.

Required Parts

Wing panel (right and let)   Wing joiner

Tools and Adhesives

30-minute epoxy   Epoxy brush
Mixing stick   Mixing cup
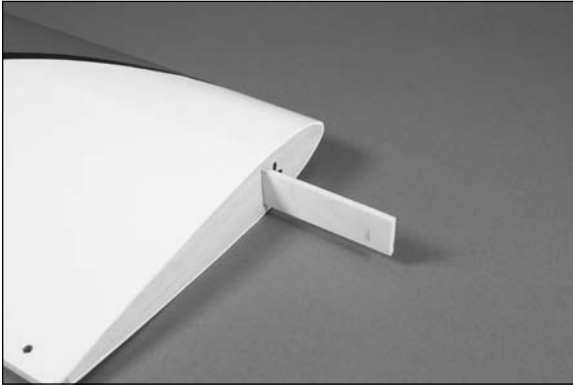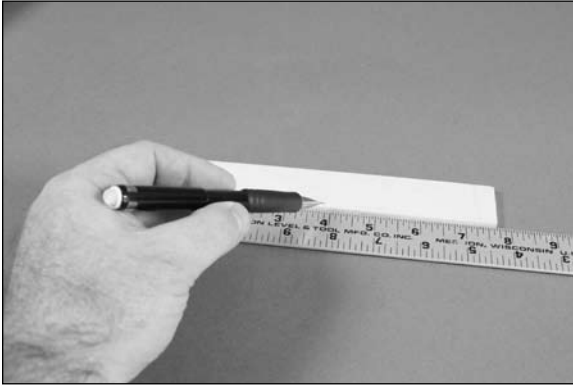Paper towel   Rubbing alcohol
Low-tack tape   Waxed paper

Step 1

Mark the wing joiner and wing panel using a felt-tipped pen. This is so you can orient the joiner correctly in this section of the manual.

☐ Step 2

Mark a center line on the joiner. It should slide into each wing panel up to the line. If not, lightly sand the joiner so it fits correctly.


☐ Step 3

Use 30-minute epoxy to glue the joiner into the wing panels. Apply epoxy in the joiner pocket and all sides of the joiner, including the top and bottom edges. Also coat the exposed wood on the root rib with epoxy. Start with one panel, insert the joiner, then the opposite panel.
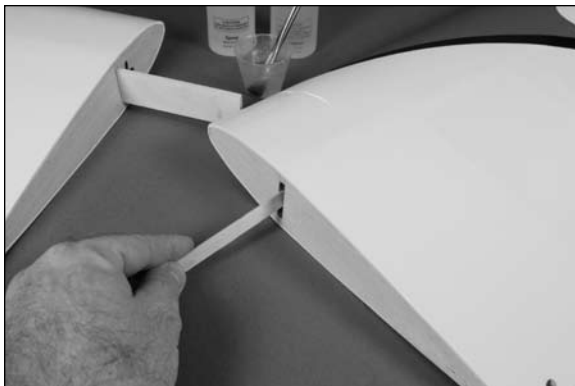
Step 4

Make sure the wing panels fit tightly together. Clean any epoxy using a paper towel and rubbing alcohol. Use low-tack tape to keep the panels tightly together while the epoxy cures.

Check alignment
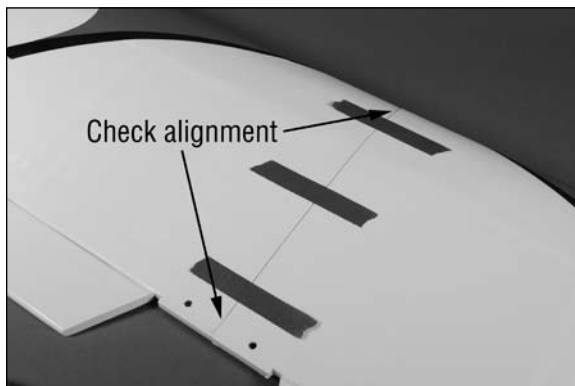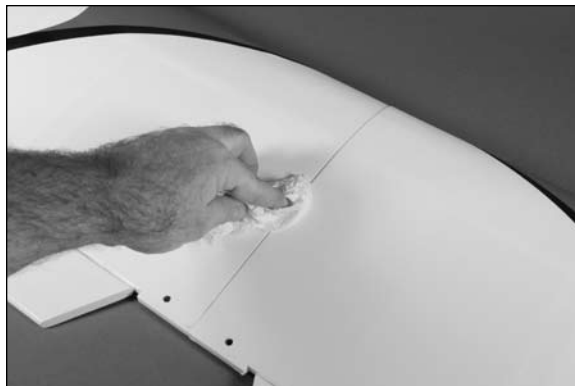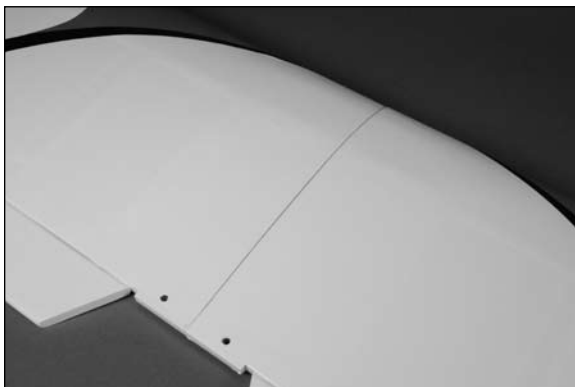
Important: Make sure the leading edge and trailing edges of the wing at the joint are aligned with each other.

Note: The wing has no dihedral. It will rest flat on your work surface while the epoxy cures. Make sure to cover your work surface with waxed paper so you don't accidentally glue the wing to your work surface.

Completing the Wing Assembly

Required Parts

Assembled wing	Wing bolt plate
Covering	Wing dowel (2)

Tools and Adhesives

|	
Hobby knife with #11 blade	Felt-tipped pen
Covering iron	30-minute epoxy
Low-tack tape	Ruler

Step 1

Use a hobby knife to remove the covering to expose the holes in the wing bolt plate. Also remove the covering from one side of the plate. Leave a 1/16-inch (1.5mm) edge of covering around the perimeter as shown in the second photo.
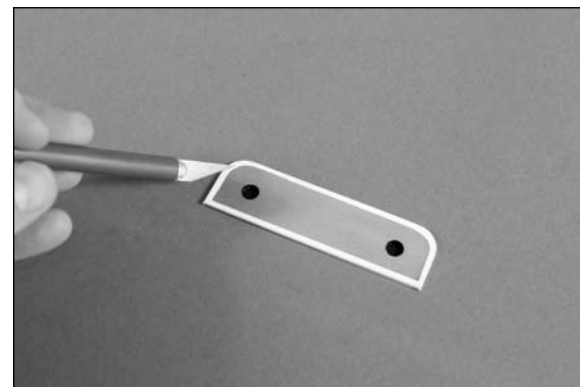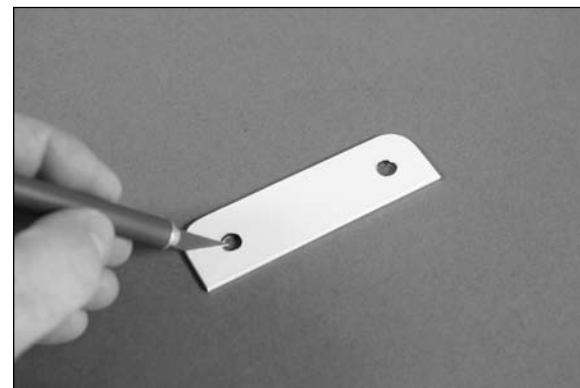
☐ Step 2

Position the wing bolt plate on the wing, aligning the holes with those in the wing. Trace the outline of the plate onto the wing using a felt-tipped pen. Use a hobby knife and #11 blade to trim the covering from the wing 1/16-inch (1.5mm) inside the line drawn.
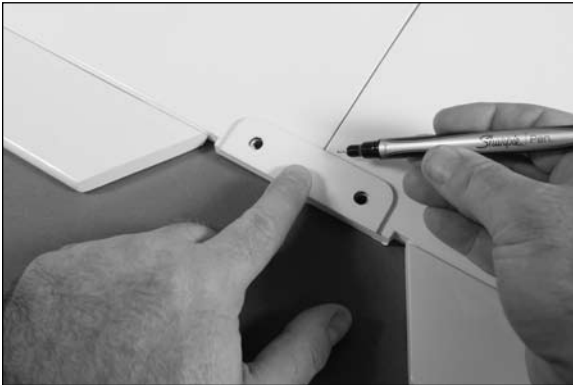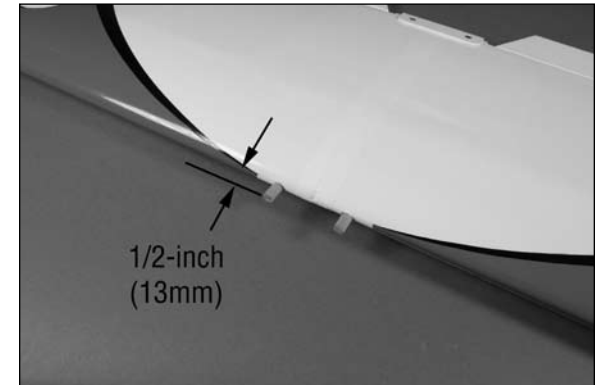

☐ Step 3

Use 30-minute epoxy to glue the wing bolt plate to the wing. Use low-tack tape to keep the plate secure while the epoxy cures. Use a covering iron to apply the covering over the seam between the wing panels.

☐ Step 4

Use 30-minute epoxy to glue the wing dowels in the leading edge of the wing. Position them so they protrude 1/2-inch (13mm) from the leading edge.

1/2-inch (13mm)

Hint: Add a radius to the front edge of the dowels to make it easier to install them in the fuselage.

Horizontal Stabilizer Installation

Required Parts

Fuselage   Wing assembly
Stabilizer
1/4-20 x 1$\frac{1}{2}$-inch nylon wing bolt (2)

Tools and Adhesives

Ruler   Felt-tipped pen
Hobby knife with #11 blade T-pin
30-minute epoxy   Flat blade screwdriver
Rubbing alcohol   Paper towels
Mixing cup   Epoxy brush
Mixing stick

☐ Step 1

Install the wing by aligning the dowels from the wing into the holes in the fuselage.

☐ Step 2

Secure the wing using two nylon wing bolts. Tighten the bolts using a flat blade screwdriver.

☐ Step 3

Use a ruler to mark the center of the stabilizer. Do not use the covering as a guide as it may not be centered. Use a T-pin at the rear of the stabilizer as a pivot and to keep the stabilizer in position on the fuselage.

☐ Step 4

Check the alignment of the stabilizer to the wing. Position the stabilizer so the measurements from the stabilizer tips to the wings tips is equal. Also check that the stabilizer is parallel to the wing. Lightly sand the stabilizer saddle if adjustments are required.

A

A=A

Parallel
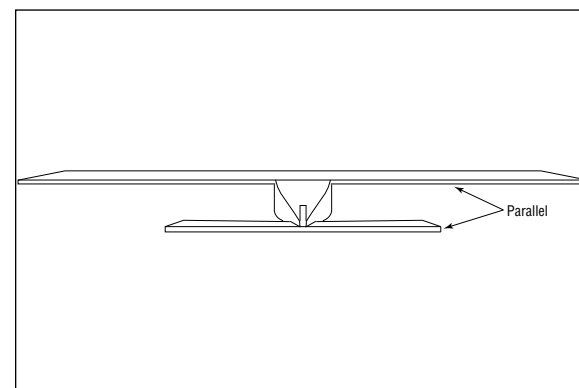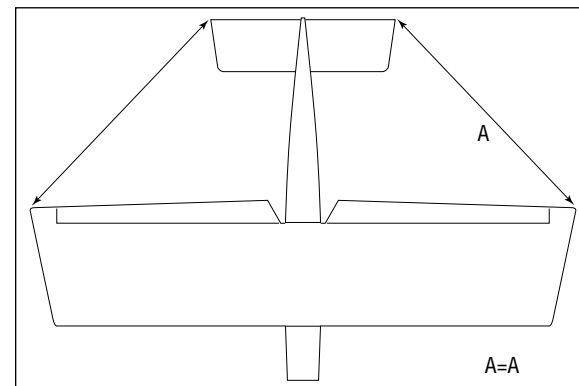
Step 5

Use a felt-tipped pen to trace the outline of the fuselage on the stabilizer. Use a hobby knife and #11 blade to remove the covering from the center of the stabilizer 1/16-inch (1.5mm) inside the line drawn. Use 30-minute epoxy to glue the stabilizer to the fuselage. Use a paper towel and rubbing alcohol to remove any excess epoxy before it has a chance to fully cure. Allow the epoxy to cure before proceeding.

Note: Do not press on the knife when cutting the covering. Cutting into the wood of the stabilizer will weaken it and cause it to fail in flight.

Vertical Fin Installation

Required Parts

Fuselage   Vertical fin

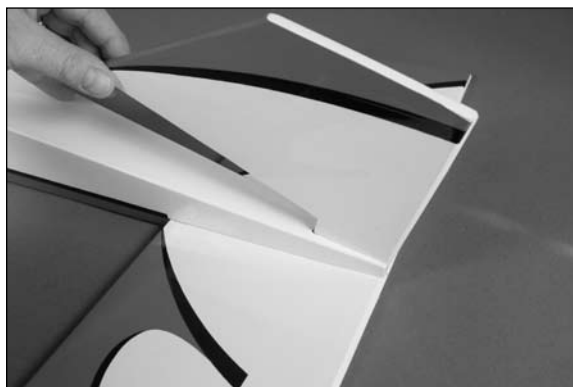**Tools and Adhesives**

Square   Felt-tipped pen
Hobby knife with #11 blade   30-minute epoxy

Step 1

Insert the fin in the slot at the rear of the fuselage. Use a felt-tipped pen to trace the outline of the fuselage on the area of the fin that fits into the fuselage. Also trace the outline of the fin on the top of the fuselage.


Step 2

Use a hobby knife and #11 blade to remove the covering from the fuselage and fin. Trim the covering 1/16-inch (1.5mm) inside the lines drawn on the fuselage, and 1/16-inch (1.5mm) below the line on the fin.

☐ Step 3

Use 30-minute epoxy to glue the fin to the fuselage. Use a square to check the alignment of the fin to the stabilizer while the epoxy cures to make sure it is aligned properly.
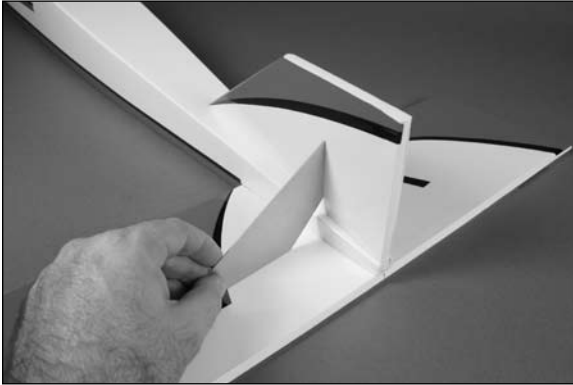
Hint: Use low-tack tape to hold the vertical fin in position until the epoxy fully cures.

Preparation for Tail Gear Installation

Required Parts

Rudder	Tail gear wire

Tools and Adhesives

|	
Pin vise	Drill bit: 1/8-inch (3mm)
Felt-tipped pen	Ruler
30-minute epoxy	Petroleum jelly
Hobby knife with #11 blade	Sandpaper

Note: This section covers preparing the rudder for the tail gear wire. If you are building the tricycle version of this model, you can skip to the next section of the manual.

☐ Step 1

Measure up 7/8-inch (22mm) from the bottom of the rudder and mark it using a felt-tipped pen. Use a pin vise and 1/8-inch (3mm) drill bit to drill a hole that is 1-inch (25mm) deep in the rudder.
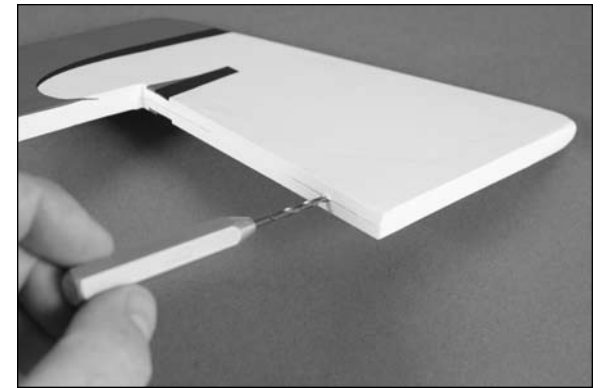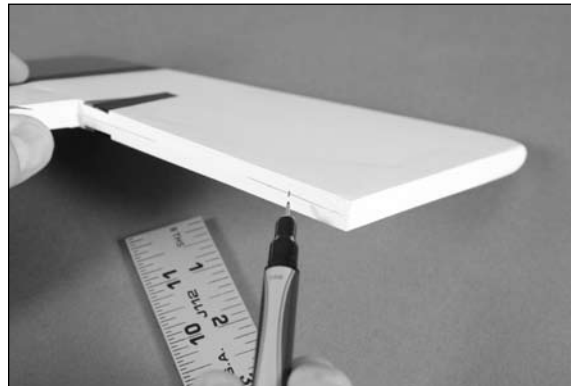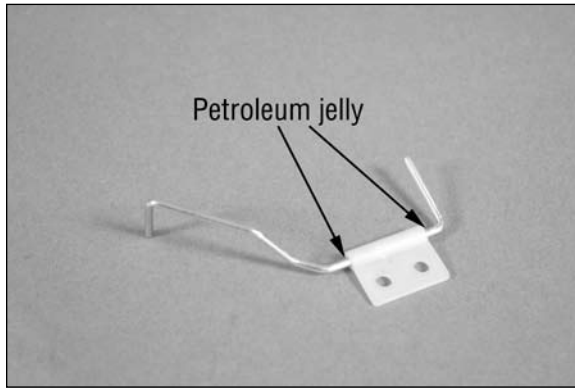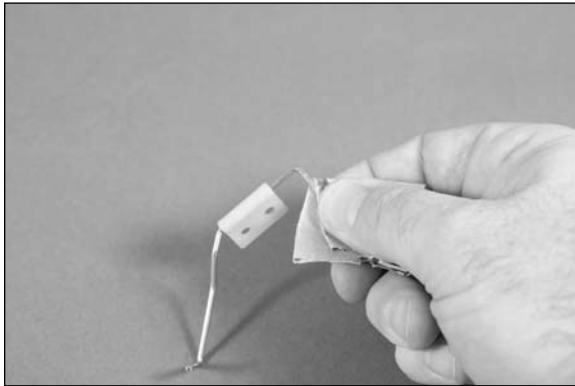

☐ Step 2

Use a hobby knife and #11 blade to cut a groove from the hole in the rudder to the bottom of the rudder for the bearing on the tail gear wire to fit into.
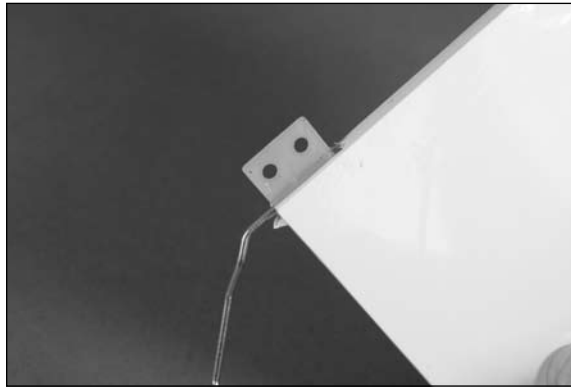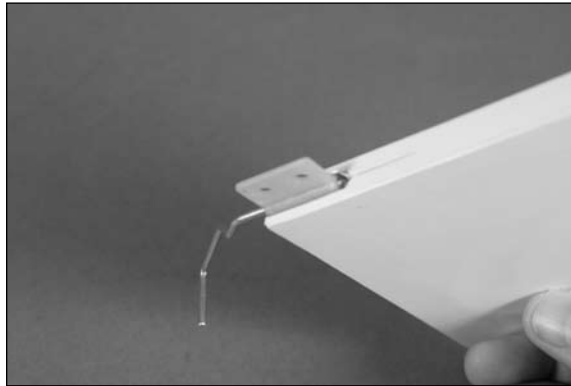
☐ Step 3

Lightly sand the end of the wire that will fit into the rudder. Apply a small amount of petroleum jelly to the top and bottom of the bearing to keep epoxy from entering the bearing.

Petroleum jelly

☐ Step 4

Insert the tail gear wire into the rudder. It should fit as shown. Use 30-minute epoxy to glue only the wire entering the rudder into the fin.

Rudder Installation

Required Parts

Fuselage assembly   Rudder assembly
CA hinge (2)

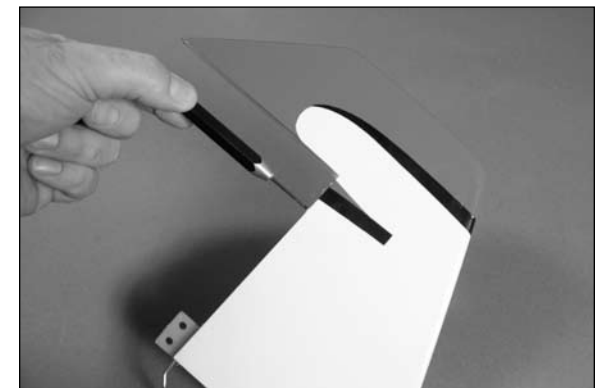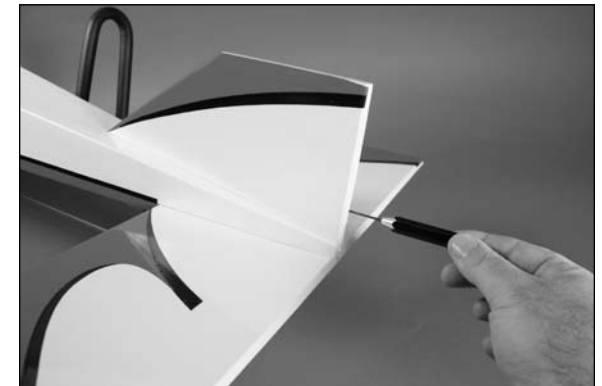**Tools and Adhesives**

Drill bit: 1/16-inch (1.5mm)   Pin vise
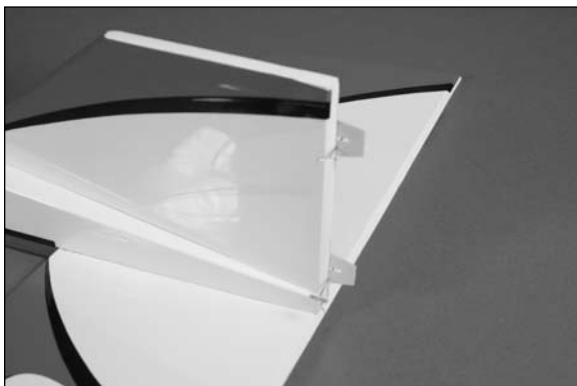Hobby knife with #11 blade   Thin CA
T-pins

☐ Step 1

Use a pin vise and 1/16-inch drill bit to drill a hole in the center of each hinge on both the fin and rudder.

Step 2

Insert a T-pin in the center of the two CA hinges. Slide the hinges into the fin.
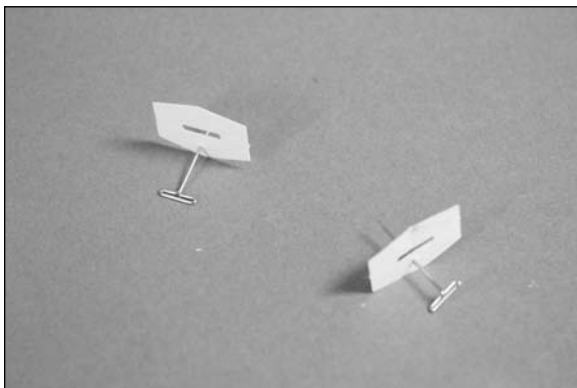
Note: If you are installing the tail wheel, it will be necessary to enlarge the slot at the bottom of the fin to fit the tail gear bushing as shown below.

Step 3

Fit the rudder to the fin. Use a hobby knife and #11 blade to check the hinge gap and that the rudder is not rubbing the top of the fin.
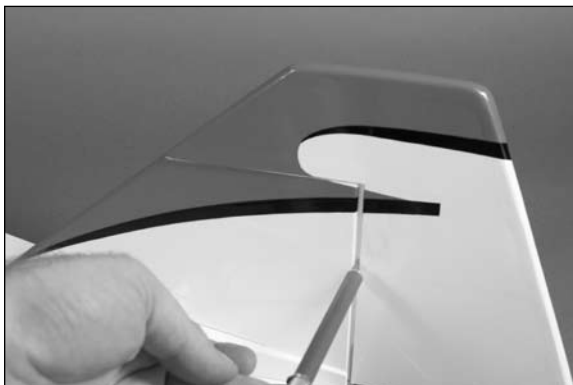
Note: If you are installing the tail wheel, use 30-minute epoxy to glue the tail gear bushing into the fuselage.

Step 4

Use thin CA to glue the two hinges that secure the rudder and fin. Perform a pull test on the hinges and break them in at this time.
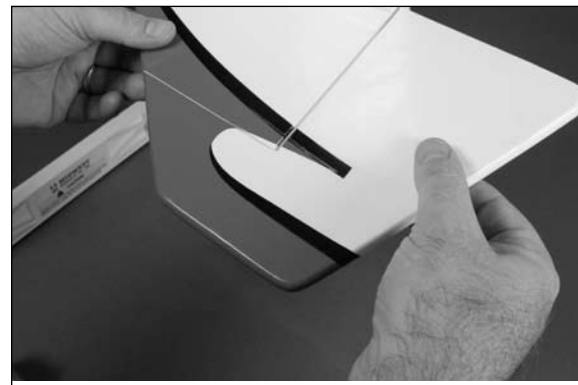
Elevator Installation

Required Parts

Fuselage assembly	CA hinge (6)
Elevator	

Tools and Adhesives

Drill bit: 1/16-inch (1.5mm)	Pin vise
Thin CA	T-pins
Rotary tool with sanding drum (optional)	
Felt-tipped pen (optional)	

Note: This first step is only necessary if you are installing the tail wheel. If you are building the tricycle version, skip to Step 2.

☐ **Step 1**

Position the elevator against the stabilizer. Use a felt-tipped pen to mark where the tail wheel wire rests against the elevator. Use a rotary tool and sanding drum to make a notch so the elevator does not bind against the wire.

☐ **Step 2**

Use a pin vise and 1/16-inch (1.5mm) drill bit to drill a hole in the center of each hinge slot in the stabilizer and elevator.
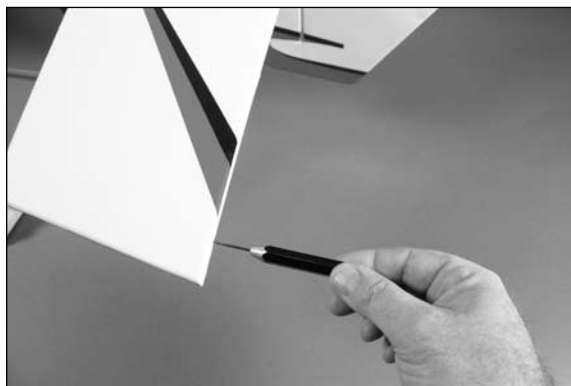
☐ **Step 3**

Insert a T-pin in the center of the six stabilizer hinges. Insert the hinges in the elevator as shown.

Step 4

Install the elevator against the stabilizer using the hinges. Set the hinge gap using a hobby knife and #11 blade. Saturate each hinge using thin CA. Allow the CA to fully cure before checking the hinges.
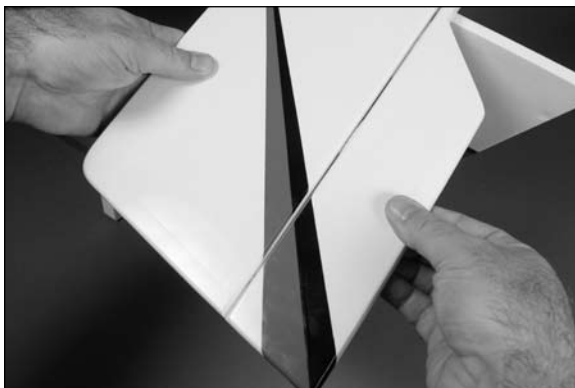
Step 5

Flex the elevator up and down a number of times to break in the hinges.
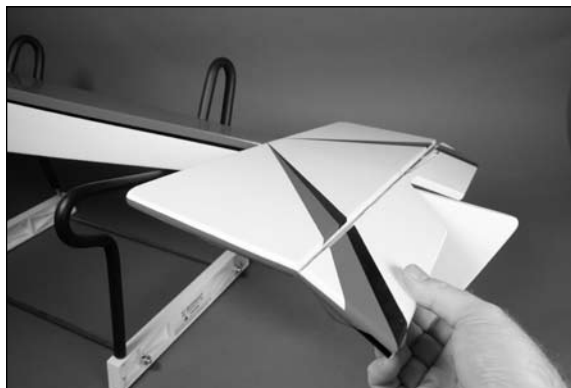
Radio Installation

Required Parts
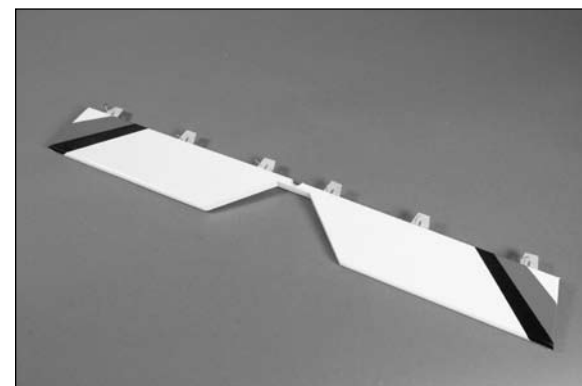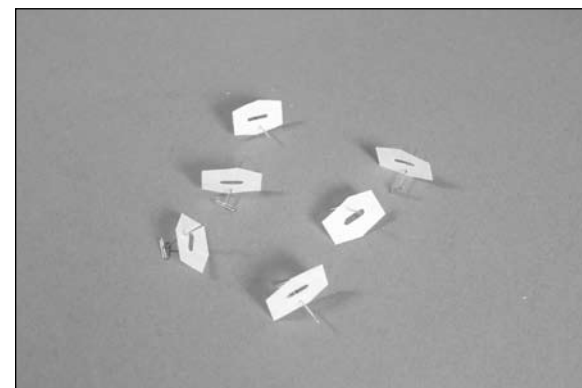
Fuselage assembly	Servo with hardware (3)
Control horn (2)	Control horn backplate (2)
Clevis retainer (2)	Clevis (2)
Pushrod keeper (2)	Screw lock connector

2-56 x 5/8-inch machine screw (4)

Pushrod wire, $27\frac{5}{8}$-inch (700mm) (2)

Tools and Adhesives

Phillips screwdriver: #1	Thin CA
Pliers	Diagonal cutter
Drill bit: 5/64-inch (2mm)	Pin vise
Threadlock	Felt-tipped pen

Step 1

Use a #1 Phillips screwdriver to thread a servo mounting screw into each of the holes in the servo tray. Apply 2–3 drops of thin CA in each hole to harden the surrounding wood.
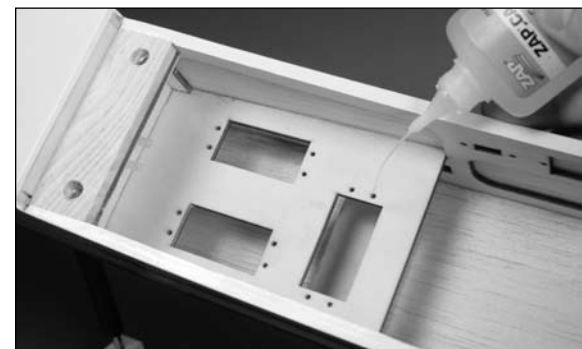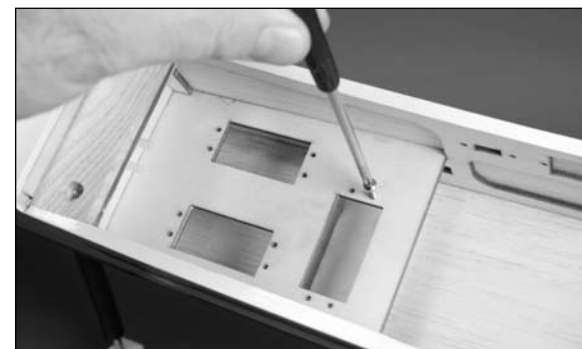
Step 2

Use the hardware to mount the servos in the fuselage as shown. Slide a 27$5/8$-inch (700mm) pushrod wire into the tube near the rudder servo. The wire will exit near the rudder as shown. Use a hobby knife and #11 blade to trim the covering so the wire can exit the fuselage.
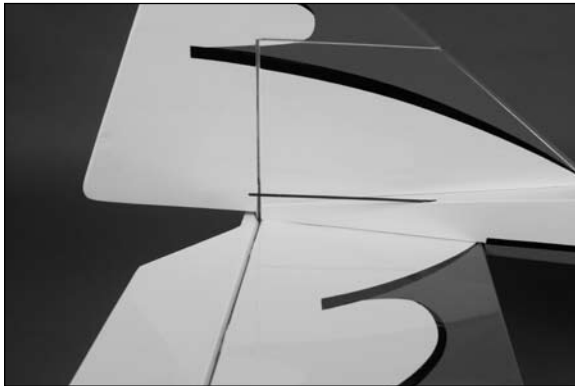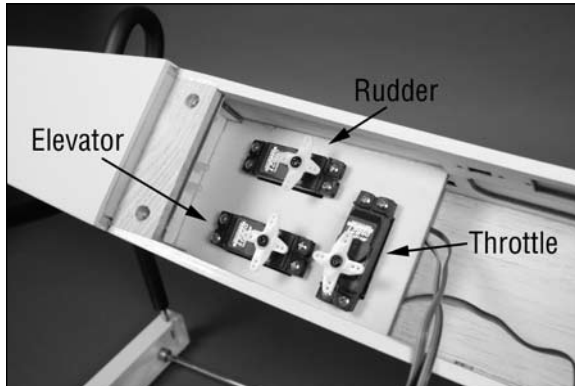
Step 3

Slide a clevis retainer on a clevis, then thread the clevis 12-turns on the pushrod wire. Connect the clevis to the control horn as shown. With the holes in the control horn aligned with the hinge line, use a felt-tipped pen to mark the mounting locations for the control horn mounting screws.
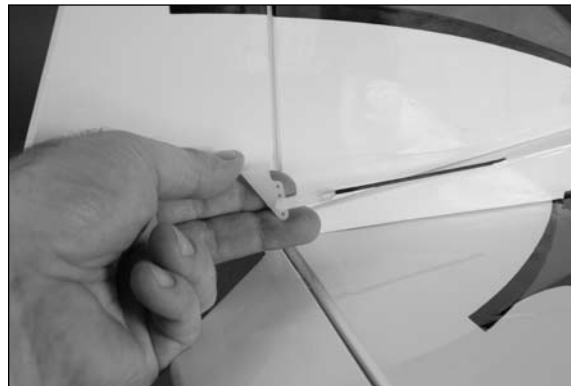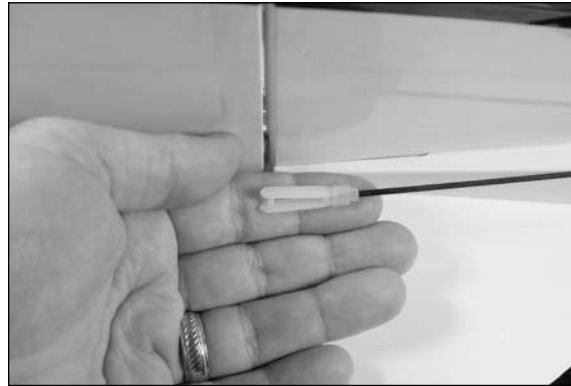
Step 4

Use a pin vise and 5/64-inch (2mm) drill bit to drill the holes for the screws. Use 2–3 drops of thin CA to harden the holes. Secure the control horn to the rudder using two 2-56 x 5/8-inch machine screws and a control horn backplate.
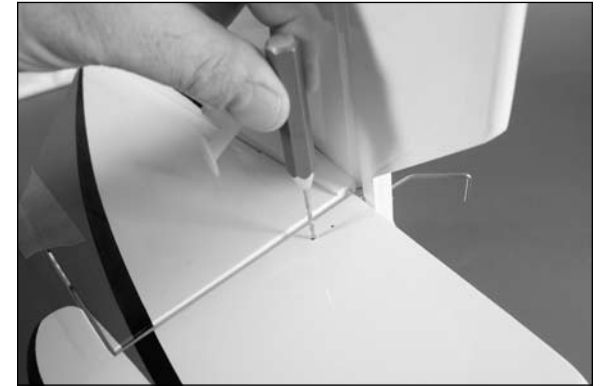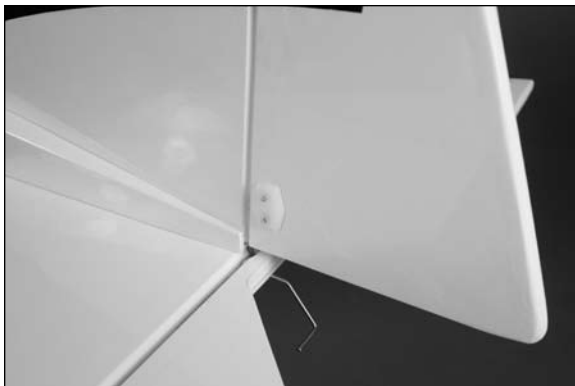
☐ Step 5

Enlarge the holes in a 180-degree control horn that are 9/16-inch (14mm) and 3/8-inch (9.5mm) from the center of the servo horn.
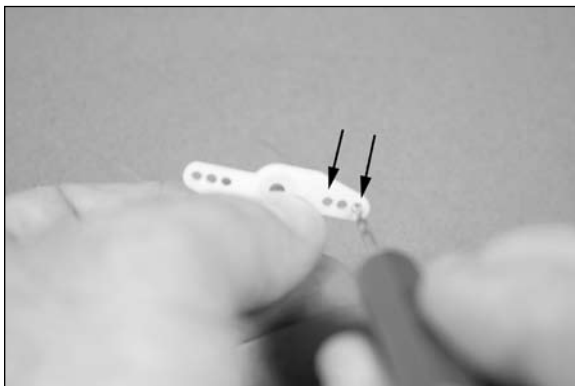
Note: If you are building the tail dragger version it is not necessary to enlarge the hole that is 3/8-inch (9.5mm) from the center of the servo horn.

Note: If you are building the tail dragger version you can skip step 6.

☐ Step 6

Use side cutters to remove the unused arms from the servo horn using diagonal cutters. Attach the pushrod connector to the inside hole of the servo arm as shown. Make sure to use threadlock on the nut so it doesn't vibrate loose.
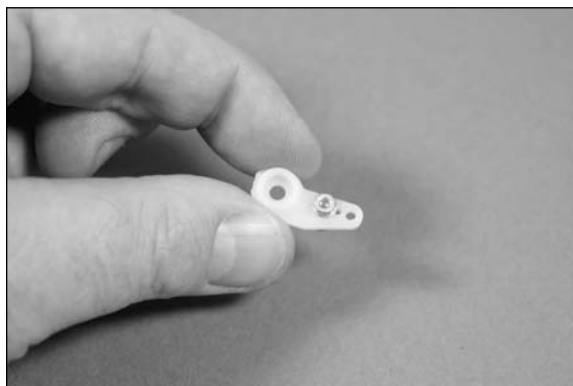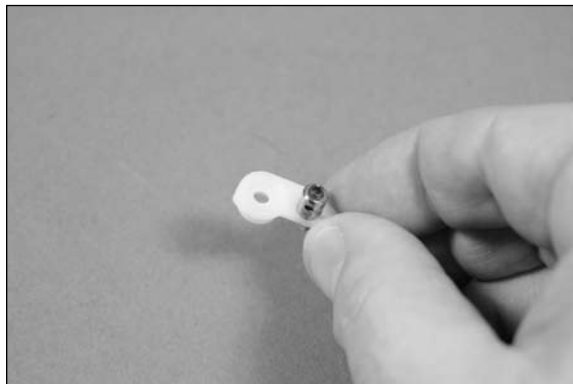
☐ Step 7

With the rudder servo centered, attach the arm to the servo. With the rudder centered, use a felt-tipped pen to mark the pushrod wire where it crosses the outside hole of the servo horn. Use pliers to bend the wire 90-degrees at the mark.
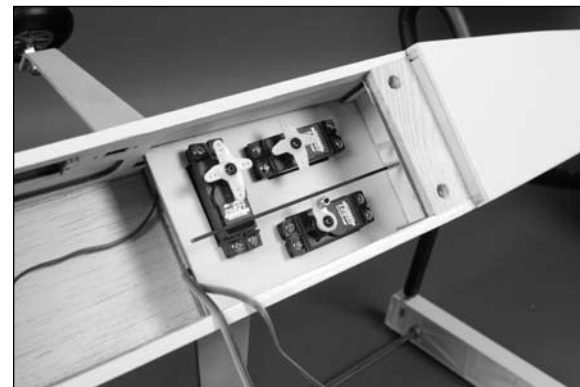
Step 8

Trim the wire 3/8-inch (9.5mm) above the bend. Use a pushrod keeper to secure the pushrod wire to the rudder servo horn.

Step 9

Repeat Steps 2 through 8 to connect the elevator pushrod wire. When preparing the servo horn, use a hole that is 1/2-inch (13mm) from the center of the servo horn.
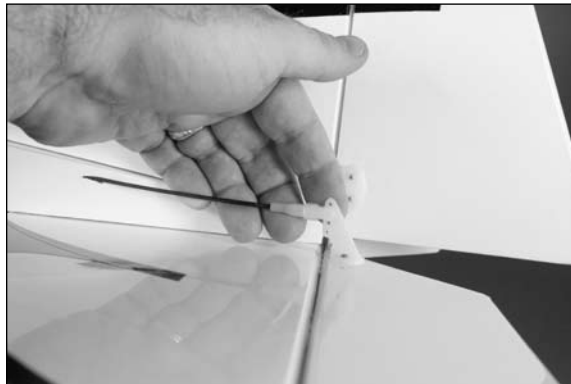
Aileron Servo Installation (Aileron only) or Flap Servo Installation (Quad Flap Version)

Required Parts

Wing assembly	Control horn (2)
Servo with hardware (2)	Pushrod keeper (2)
Control horn backplate (2)	Clevis (2)
2-56 x 3/8 machine screw (4)	Clevis retainer (2)
Pushrod wire, 6-inch (152mm) (2)	

Tools and Adhesives

Pin vise	Pliers
Diagonal cutters	Felt-tipped pen
Hobby knife with #11 blade	Thin CA
String	Weight
Phillips screwdriver: #1	
Drill bit: 1/16-inch (1.5mm), 5/64-inch (2mm)	

Note: This section is for both the installation of the aileron servo (aileron only) and for the flap servo (quad flap) version of your model. The aileron servo for the quad flap version will be installed in the next section of the manual.

Step 1

Use a hobby knife and #11 blade to remove the covering for the inboard servo in the bottom of the wing.

☐☐ Step 2

Tie a weight (wheel collar or nut) to a 12-inch (300mm) piece of string and lower it into the opening for the servo. Tip the wing up so the weight can be retrieved at the center of the wing as shown.
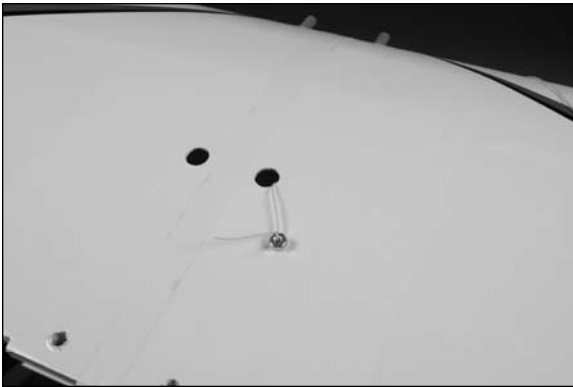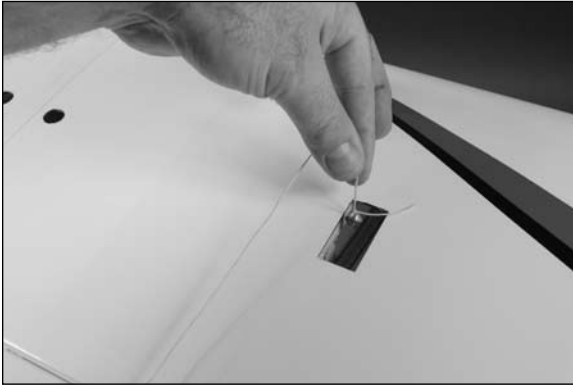
☐☐ Step 3

Tie the string around the servo lead. Pull the lead through the wing and out of the hole at the center.
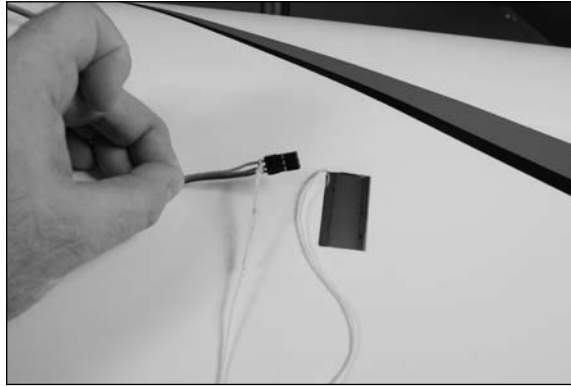
☐☐ Step 4

Position the servo in the wing with the servo output shaft toward the aileron (or flap). Use a felt-tipped pen to mark the locations for the mounting screws. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill the holes for the screws. Use 2–3 drops of thin CA to harden the surrounding wood.
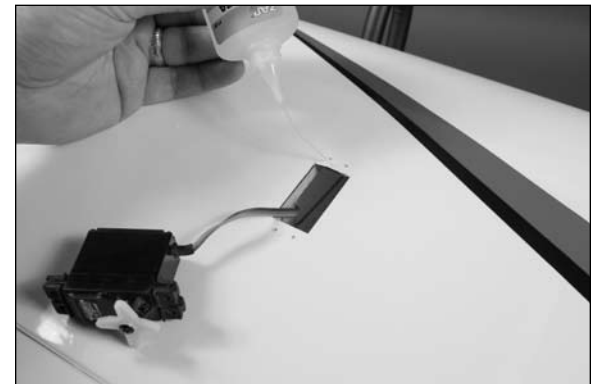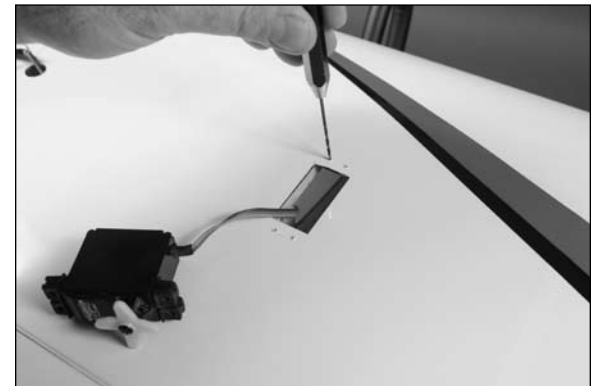
Step 5

Secure the servo in the wing using a #1 Phillips screwdriver and the hardware provided with the servo.

Step 6

Slide a clevis retainer on a clevis, then thread the clevis 12-turns on a 6-inch (152mm) pushrod wire. Connect the clevis to the control horn as shown.
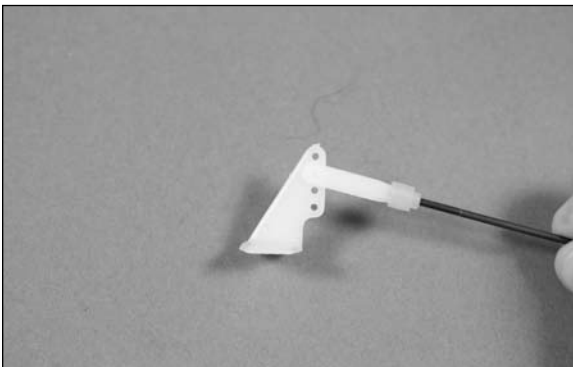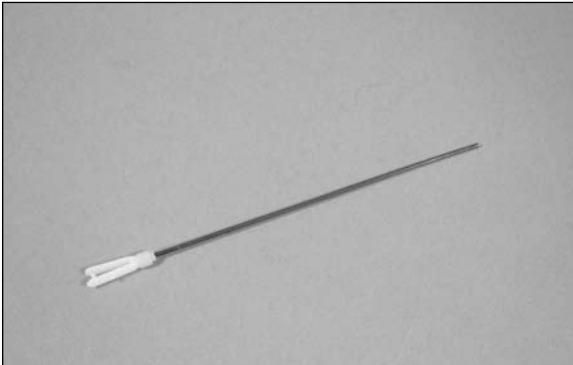
Step 7

Use a pin vise and 5/64-inch (2mm) drill bit to enlarge the hole in the servo horn that is 1/2-inch (13mm) from the center of the horn. With the pushrod wire aligned 90-degrees to the hinge line and the holes in the control horn aligned with the hinge line, use a felt-tipped pen to mark the control surface for the control horn screws.
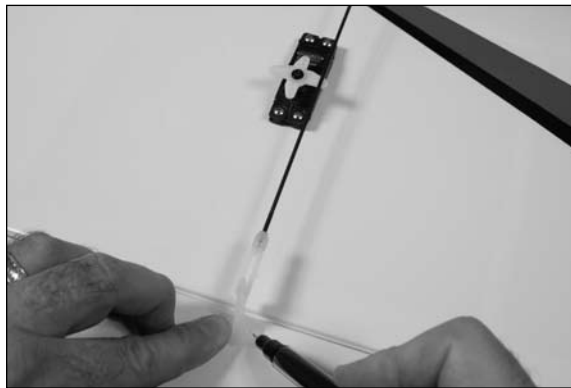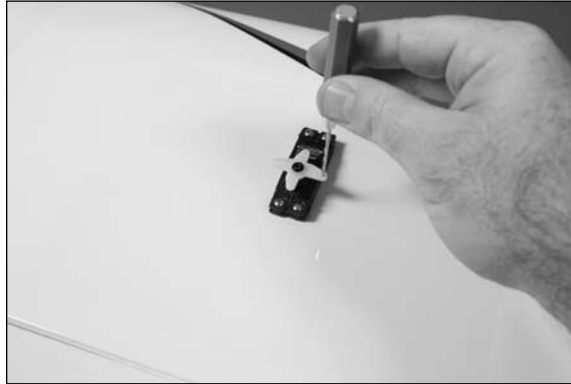
Step 8

Use a pin vise and a 5/64-inch (2mm) drill bit to drill the two holes for the control horn screws. Apply 2–3 drops in each hole to harden the surrounding wood. Secure the control horn using two 2-56 x 5/8-inch machine screws and a control horn backplate. Tighten the screws using a #1 Phillips screwdriver.
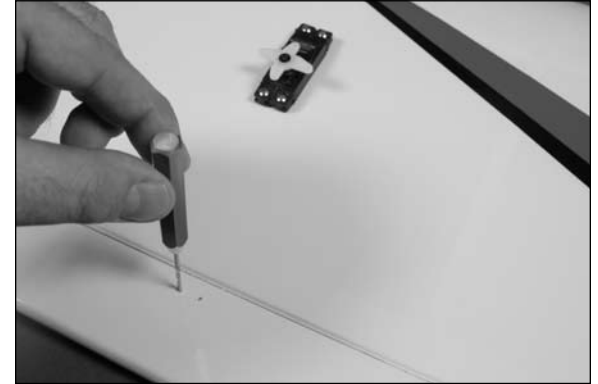
Step 9

With the control surface centered, use a felt-tipped pen to mark the pushrod where it crosses the hole of the servo horn. Use pliers to bend the pushrod 90-degrees at the mark.
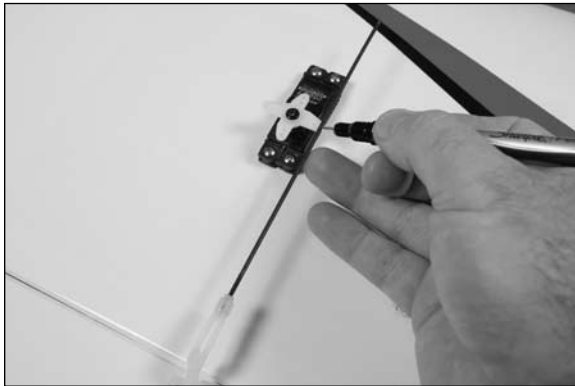

Step 10

Use diagonal cutters to trim the pushrod wire 3/8-inch (9.5mm) above the bend. Secure the pushrod wire to the servo horn using a pushrod keeper. Use diagonal cutters to remove any unused servo arm from the servo horn.
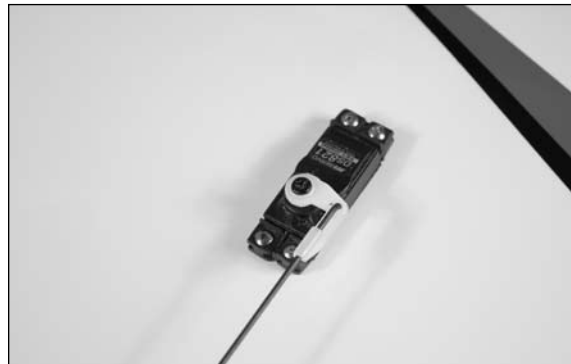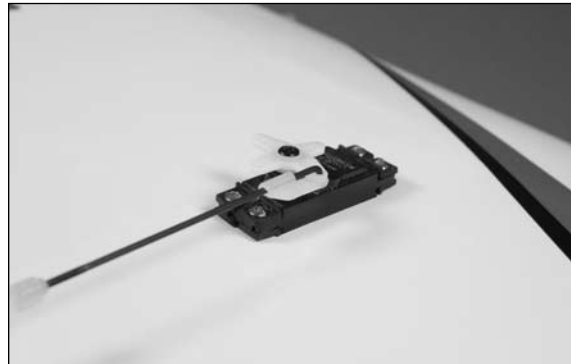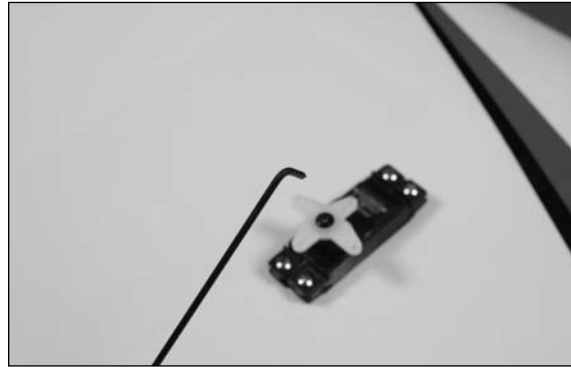
Step 11

Repeat Steps 1 through 10 to install the remaining servo.

Aileron Servo Installation (Quad Flap Version)

Required Parts

Wing assembly	Control horn (2)
Servo with hardware (2)	Pushrod keeper (2)
Control horn backplate (2)	Clevis (2)
2-56 x 3/8 machine screw (4)	Clevis retainer (2)
9-inch (230mm) servo extension (2)	
Pushrod wire, 6-inch (152mm) (2)	

Tools and Adhesives

Pin vise	Pliers
Diagonal cutters	Felt-tipped pen
Hobby knife with #11 blade	Thin CA
String	Weight
Phillips screwdriver: #1	
Drill bit: 1/16-inch (1.5mm), 5/64-inch (2mm)	

Note: This section details the installation of the aileron servo when using quad flaps. You can skip this section if you are not building your model to use quad flaps.

Step 1

Use string to secure a 9-inch (230mm) servo extension to the aileron servo.
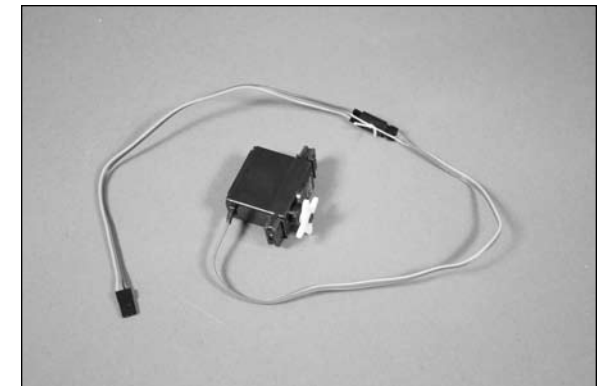
## ☐☐ Step 2

Use a hobby knife and #11 blade to remove the covering for the outboard servo in the bottom of the wing. Tie a weight (wheel collar or nut) to a 12-inch (300mm) piece of string and lower it into the opening for the servo. Tip the wing up so the weight can be retrieved at the center of the wing as shown.

☐☐ Step 3

Position the servo in the wing with the servo output shaft to the aileron (or flap). Use a felt-tipped pen to mark the locations for the mounting screws. Use a pin vise and 1/16-inch (1.5mm) drill bit to drill the holes for the screws. Use 2–3 drops of thin CA to harden the surrounding wood.
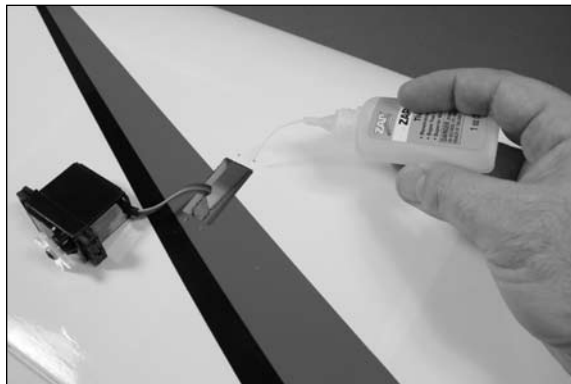
☐☐ Step 4

Secure the servo in the wing using a #1 Phillips screwdriver and the hardware provided with the servo.
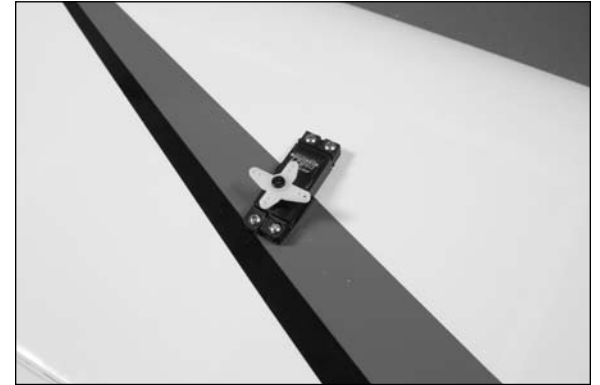
☐☐ Step 5

Slide a clevis retainer on a clevis, then thread the clevis 12-turns on a 6-inch (152mm) pushrod wire. Connect the clevis to the control horn as shown.
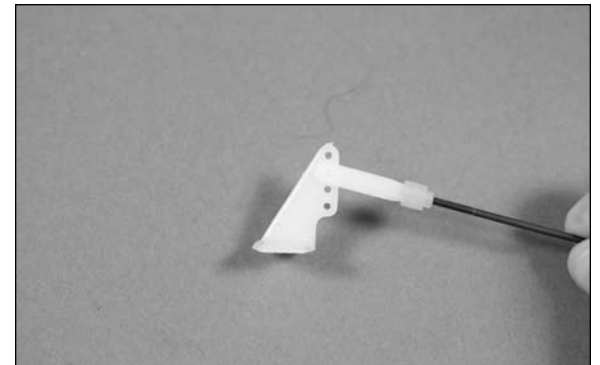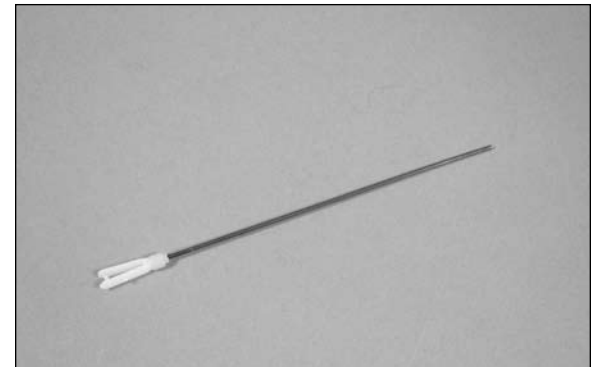
Step 6

Use a pin vise and 5/64-inch (2mm) drill bit to enlarge the hole in the servo horn that is 1/2-inch (13mm) from the center of the horn. With the pushrod wire aligned 90-degrees to the hinge line and the holes in the control horn aligned with the hinge line, use a felt-tipped pen to mark the control surface for the control horn screws.
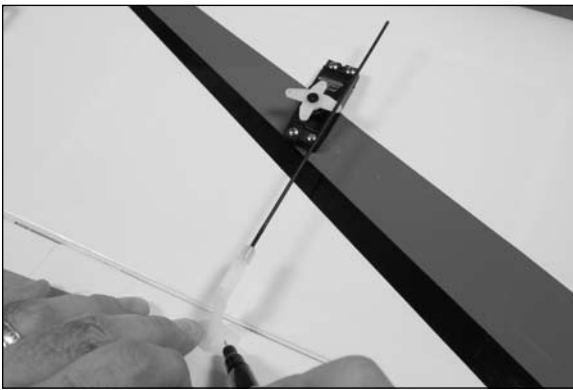
Step 7

Use a pin vise and a 5/64-inch (2mm) drill bit to drill the two holes for the control horn screws. Apply 2–3 drops in each hole to harden the surrounding wood. Secure the control horn using two 2-56 x 5/8-inch machine screws and a control horn backplate. Tighten the screws using a #1 Phillips screwdriver.
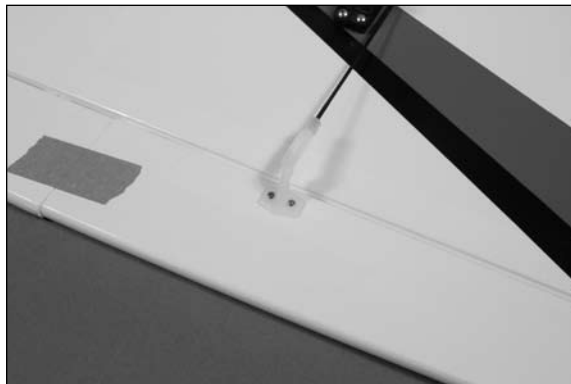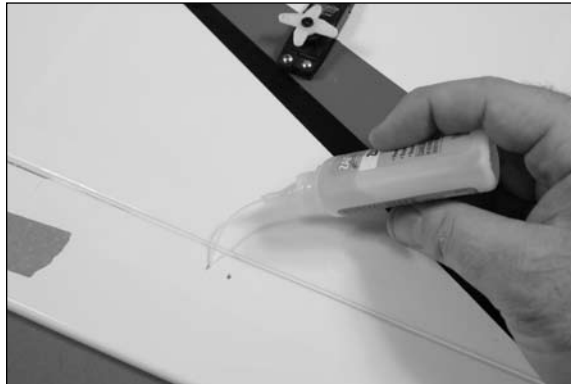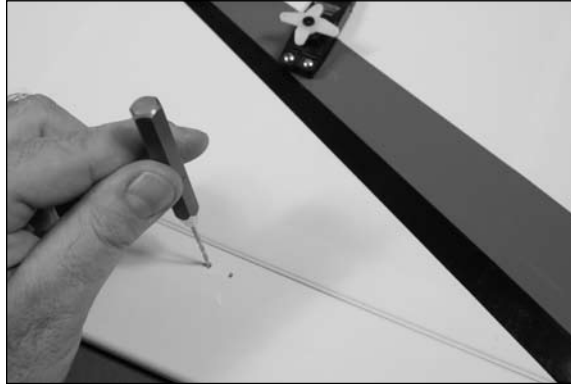
Step 8

With the control surface centered, use a felt-tipped pen to mark the pushrod where it crosses the hole of the servo horn. Use pliers to bend the pushrod 90-degrees at the mark.
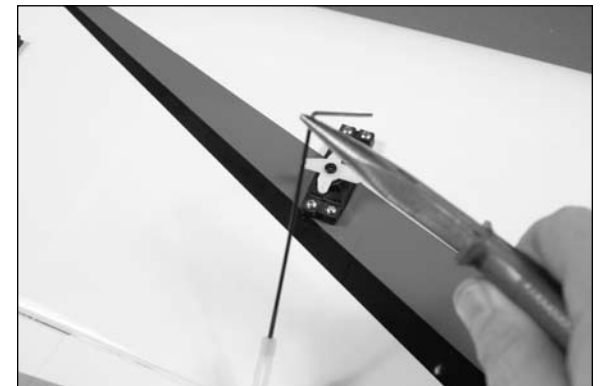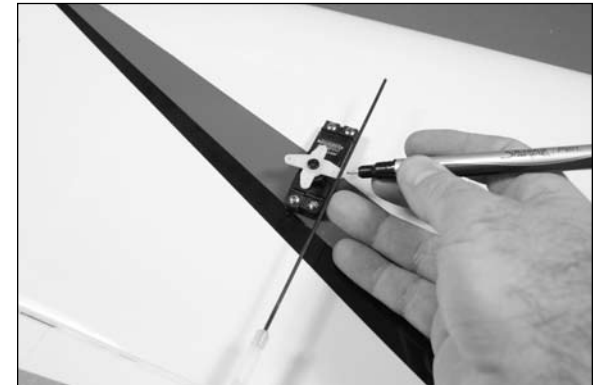
□□ Step 9

Use diagonal cutters to trim the pushrod wire 3/8-inch (9.5mm) above the bend. Secure the pushrod wire to the servo horn using a pushrod keeper.
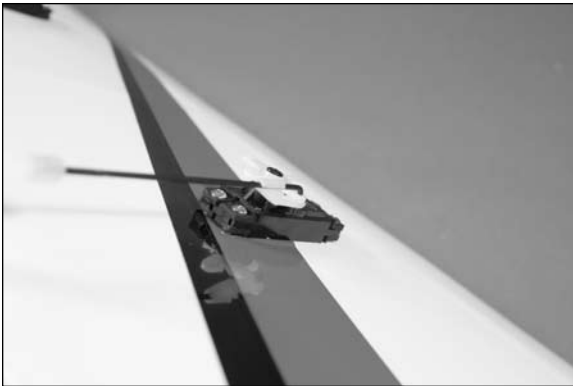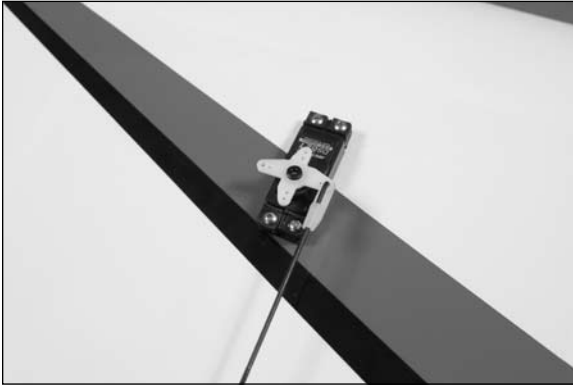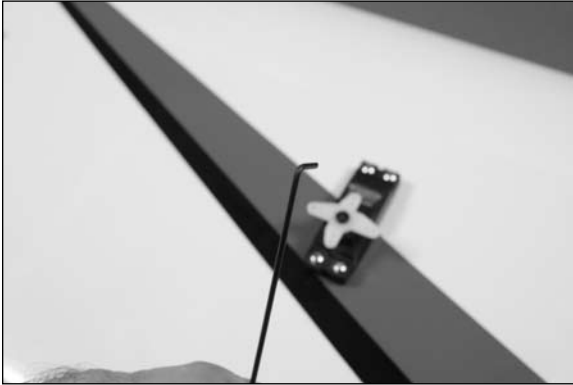
Note: All the servos will face to the wing tips. You will need to use a reverse servo for one of the flap's servos or a computer radio for the flap servos to operate properly. Use diagonal; cutters to remove the unused servo arms from the servo horns.
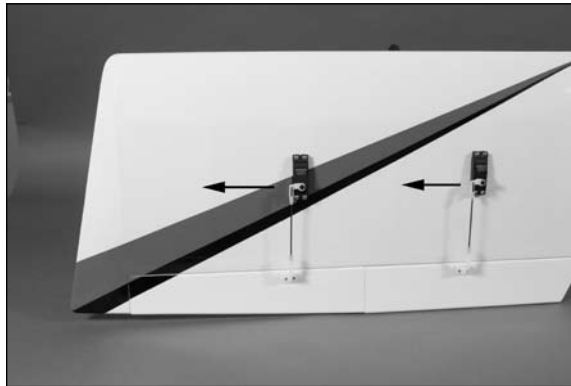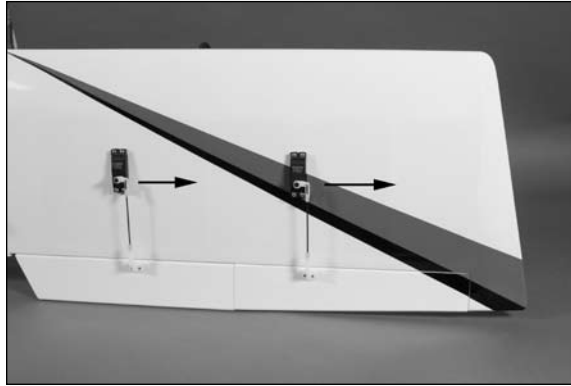
□ Step 10

Repeat Steps 1 throught 9 to install the remaining servo.

Landing Gear Installation

Required Parts

Fuselage assemble   Landing gear
Axle with hardware (2)
Main wheel, $2^1/_2$-inch (63mm) (2)
8-32 x 5/8-inch machine screw (2)
Wheel collar with setscrew, 1/16-inch
Wheel collar with setscrew, 4mm (4)

Tools and Adhesives

Threadlock   Flat file
Hobby knife with #11 blade   Ruler
Phillips screwdriver: #2
Hex wrench: 1.5mm (included)
Open-end wrench or socket: 10mm, 1/2-inch

□ Step 1

Use a 10mm and 1/2-inch wrench or socket to attach the axle to the landing gear. File a flat on the axle that is the first 1/4-inch (6mm) and a 1/4-inch (6mm) wide area 1-inch (25mm) from the end of the axle.

1-inch (25mm)
Make 1/4-inch (6mm) wide

First 1/4-inch (6mm)
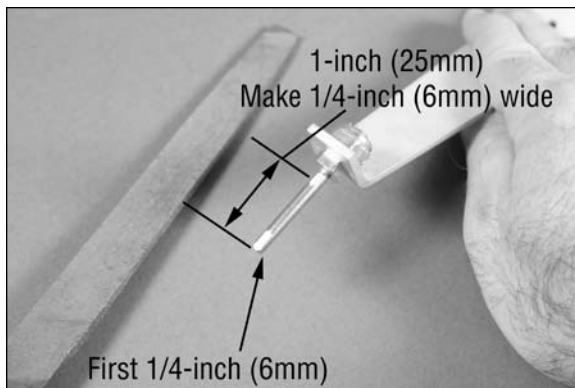
☐ Step 2

Apply threadlock to the setscrews that will be used in the two 4mm wheel collars. The collars are on either side of the wheel. Make sure to tighten the setscrews on the flat areas of the axle made in the previous step.
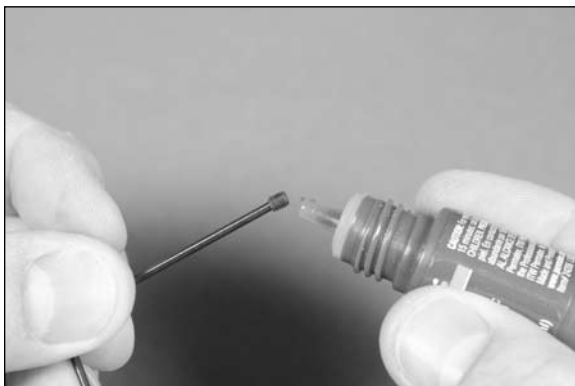
☐ Step 3

Repeat Steps 1 and 2 to attach the remaining wheel. When installing the gear, note the angle of the gear. The angled edge will be to the rear of the fuselage when installed.

Angled edge
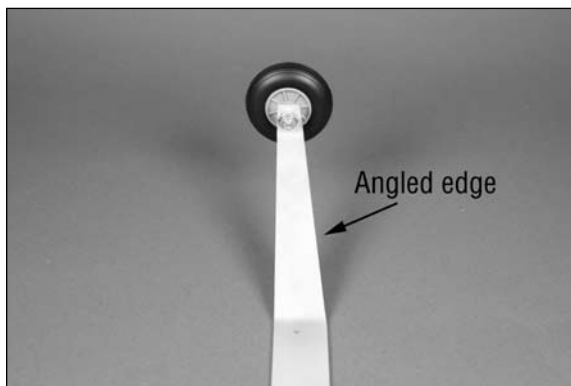
☐ Step 4

Measure back $6\frac{5}{8}$-inches (168mm) (tail dragger) or $12\frac{1}{2}$-inches (317mm) (tricycle gear) and use a hobby knife to expose the two blind nuts in the fuselage for attaching the main landing gear.

$6\frac{5}{8}$-inches (168mm) Tail dragger

$12\frac{1}{2}$-inches (317mm) Tricycle
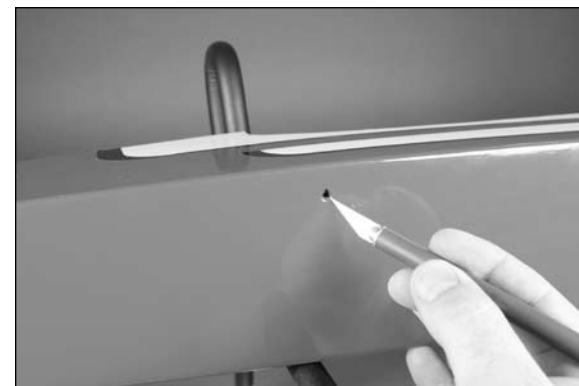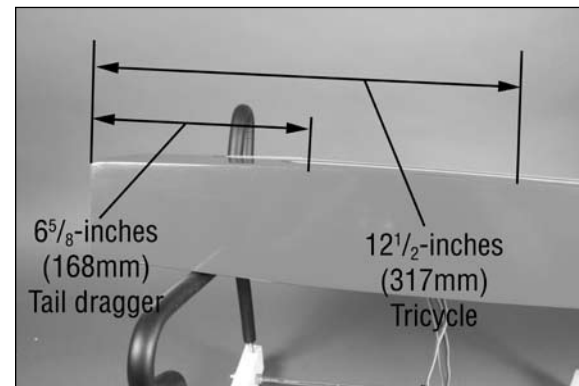
☐ Step 5

Apply threadlock to the two 8-32 x 5/8-inch machine screws. Use the screws and a #2 Phillips screwdriver to attach the gear. Remember that the angled edge faces to the rear of the fuselage. You can attach the tail wheel to the tail gear at this time as well using a 1/16-inch wheel collar and setscrew.

Engine Installation

Required Parts

Fuselage assembly	#8 washer (4)
#6 washer (4)	6-32 locknut (4)
Engine	Plywood pushrod standoff
Engine mount rail (right and left)	

6-32 x 1-inch socket head screw (4)
8-32 x 1-inch socket head screw (4)
Pushrod tube, $13^3/_4$-inch (350mm) throttle
Pushrod tube, $13^3/_4$-inch (350mm) nose gear steering
Pushrod, $17^1/_2$-inch (445mm)

Tools and Adhesives

Drill bit: 9/64-inch (3.5mm), 5/32-inch (4mm)	
Drill	Nut driver: 5/16-inch
Felt-tipped pen	Ruler
Sandpaper	Diagonal cutters
Hobby knife with #11 blade	Medium CA
Hex wrench: 1/8-inch, 7/64-inch	

☐ Step 1

Use a hobby knife with a #11 blade to remove the covering to expose the blind nuts and opening for the fuel tank at the front of the fuselage.

Note: Steps 2 through 4 are for the installation of the nose gear steering pushrod tube. If you are building the tail dragger version skip to Step 5.

☐ Step 2

Use a felt-tipped pen to mark the front of the fuselage as shown. Use a drill and 5/32-inch (4mm) drill bit to drill a hole for the nose gear steering pushrod tube.
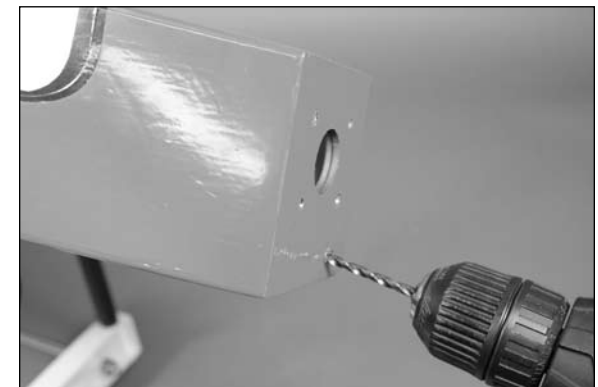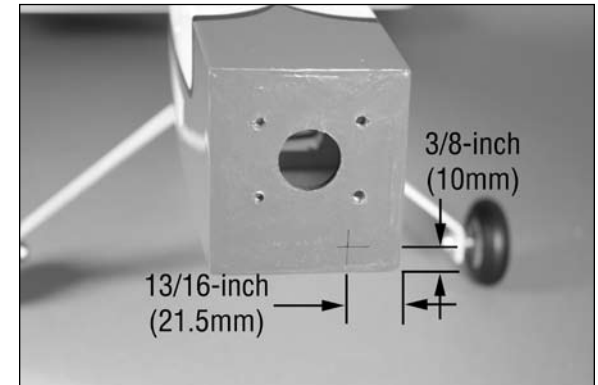
Step 3

Use sandpaper to roughen the first 1-inch (25mm) of each end on the 13³/₄-inch (350mm) nose gear pushrod rod tube. Also roughen a 1-inch (25mm) wide section that is 6-inches (152mm) from one end of the tube. Insert the tube in the hole drilled in the previous step.

Roughen 1-inch (25mm) wide sections

6-inches (152mm)
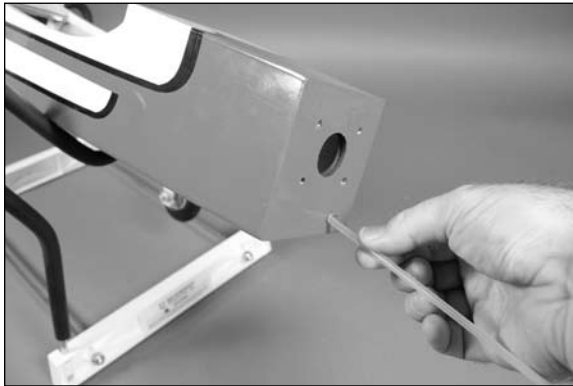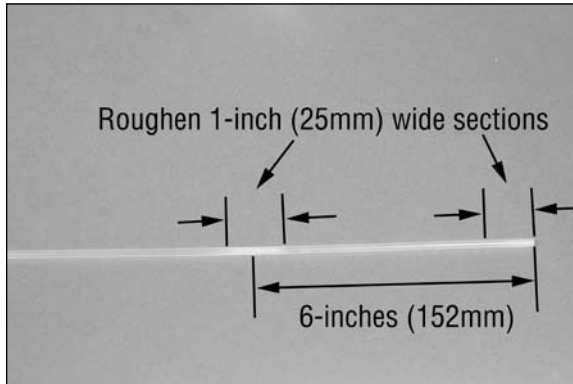
Step 4

Position the tube flush with the firewall. Use medium CA to glue the pushrod tube. Use medium CA to glue the tube at the firewall and former. Slide the plywood pushrod standoff on the tube, but do not glue it at this time.
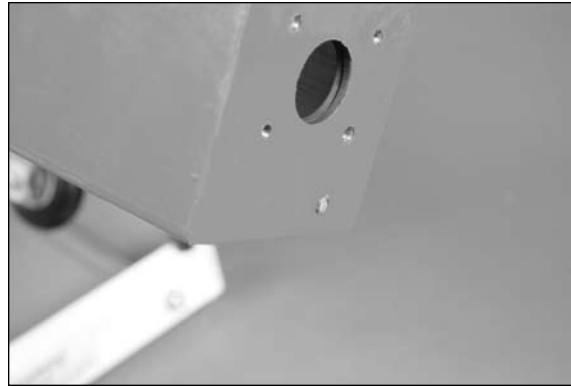
Step 5

Attach the engine mount rails to the firewall using four 8-32 x 1-inch socket head screws and four #8 washers. Use a 1/8-inch hex wrench to tighten the screws. Leave them slightly loose so the mount rails can be moved to fit your particular engine.
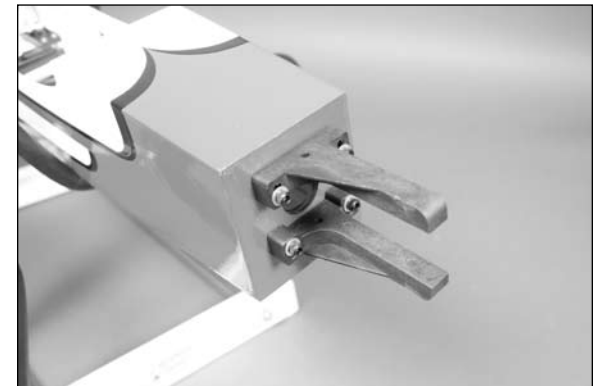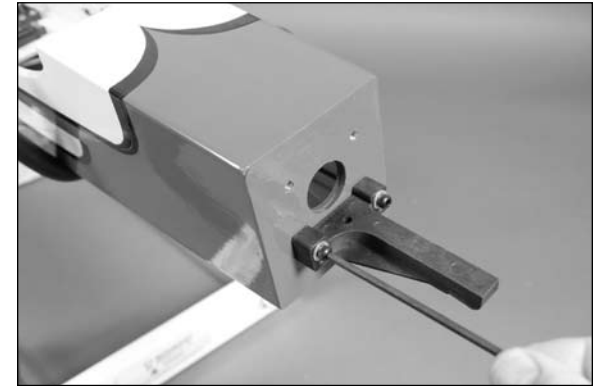
Note: Step 6 is only necessary if you are installing a four-stroke engine. Skip to step 7 if you are installing a two-stroke engine.

☐ Step 6

Note the direction of the carburetor in relationship to the engine. It may be necessary to rotate the carburetor on your engine to match the photo.

☐ Step 7

Position the engine between the engine mount rails. Use a felt-tipped pen to mark the firewall where the throttle pushrod tube will be positioned.
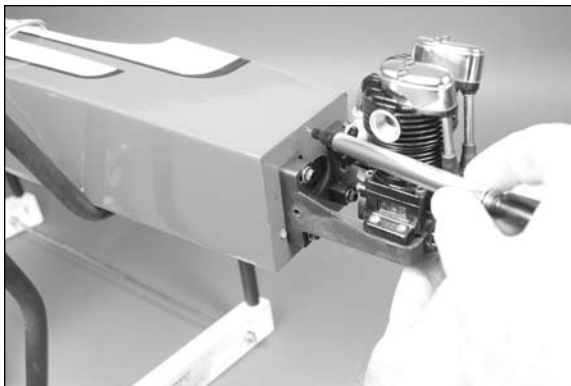
☐ Step 8

Use a drill and 5/32-inch (4mm) drill bit to drill the firewall for the throttle pushrod tube.
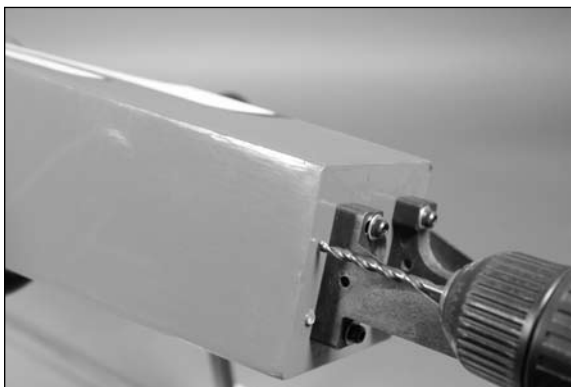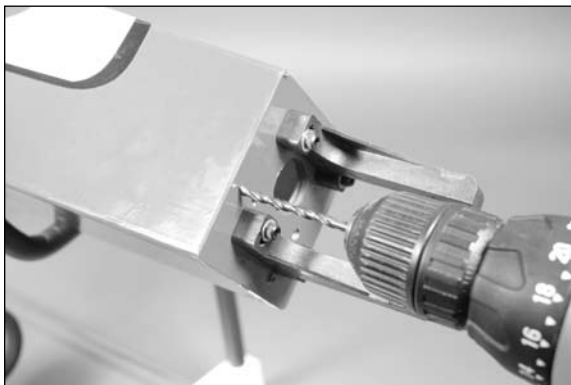
☐ Step 9

Use sandpaper to roughen the first 1-inch (25mm) of each end on the $13^3/_4$-inch (350mm) throttle pushrod rod tube. Also roughen a 1-inch (25mm) wide section that is 6-inches (152mm) from one end of the tube.

Roughen 1-inch (25mm) wide sections

6-inches (152mm)
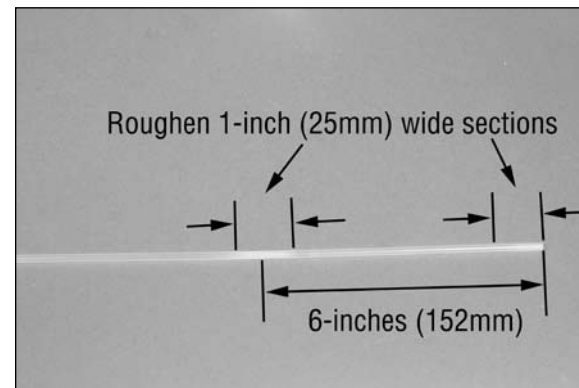
☐ Step 10

Insert the tube into the hole drilled earlier. The two-stroke will have the tube extended 3/4-inch (19mm) forward of the firewall, while the four-stroke will be flush with the firewall.

two-stroke
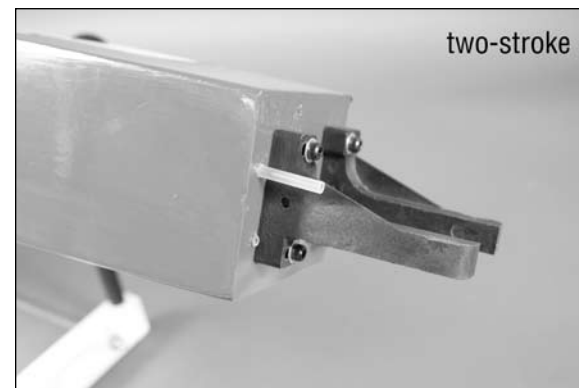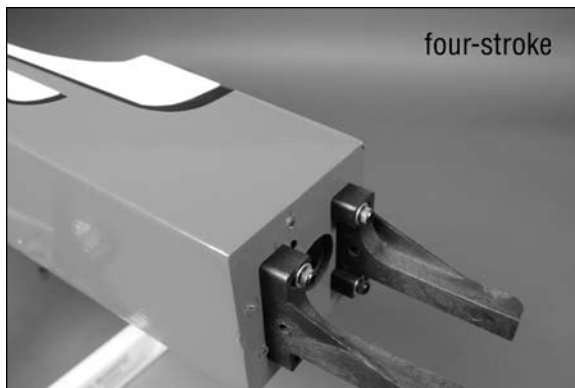
four-stroke

Step 11

The tube will pass through the hole in the former in the fuselage. Trim the tube at the front edge of the servo tray using diagonal cutters. Use medium CA to glue the tube to the firewall and former.
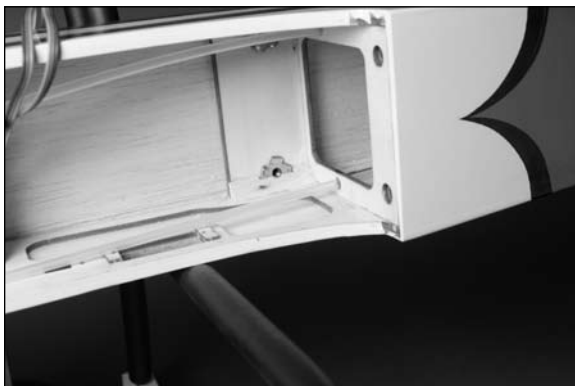
Step 12

Position the engine so the drive washer is $4^7/_8$-inches (124mm) forward of the firewall. Use a pencil to transfer the locations for the engine mounting screws on the engine mount rails.

$4^7/_8$-inches (124mm)

$4^7/_8$-inches (124mm)
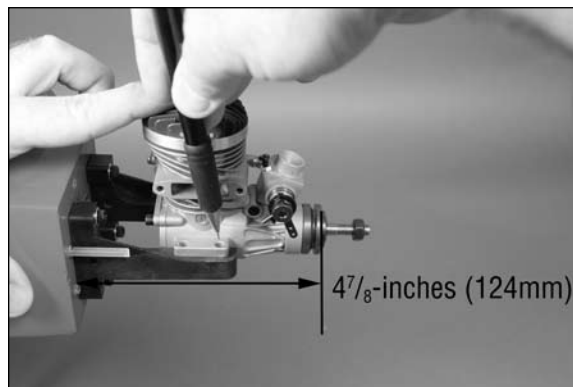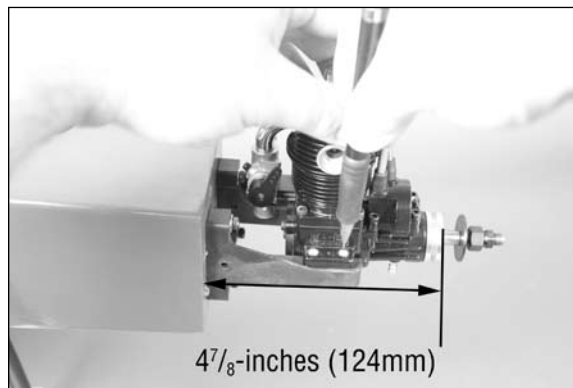
Step 13

Use a drill and 9/64-inch (3.5mm) drill bit to drill the four holes to mount the engine. It is suggested to use a drill press so the holes are straight in the mounting rails.
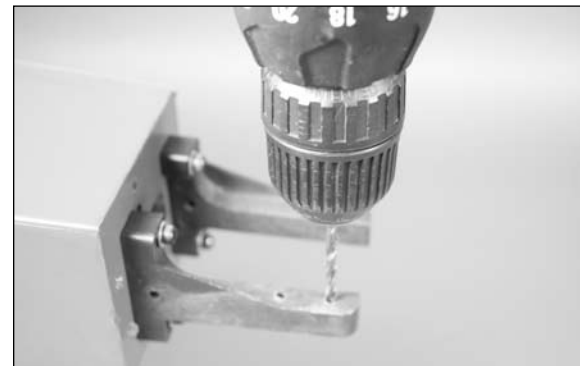
Step 14

Attach the bend in the $17^1/_2$-inch (445mm) pushrod to the carburetor arm on your engine.
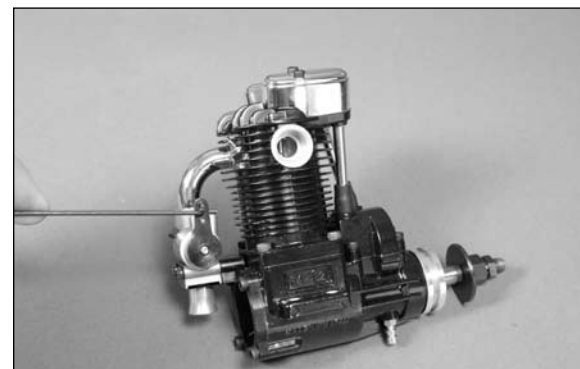
Step 15

Secure the engine to the engine mount rails using four 6-32 x 1-inch socket head screws, four 6-32 locknuts and four #6 washers. Use a 7/65-inch hex wrench and 5/16-inch nut driver to tighten the hardware.
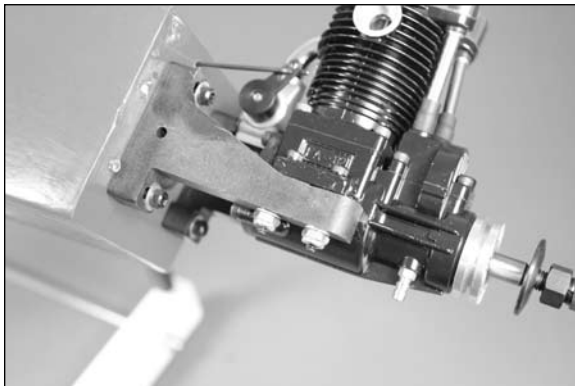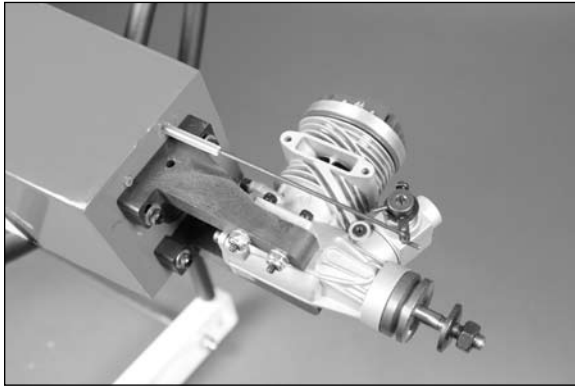
Nose Gear Installation

Required Parts

Fuselage assembly	Wheel, $2\frac{1}{2}$-inch (63mm)
Nose gear wire	Steering arm
Pushrod connector with hardware	
Wheel collar with setscrew, 4mm (4)	
Pushrod, $17\frac{1}{2}$-inch (445mm)	

Tools and Adhesives

Flat file	Diagonal cutters
Threadlock	Ruler
Phillips screwdriver: #2	Medium CA
Hex wrench: 1.5mm (included)	

Note: This section covers the installation of the nose gear for the tricycle version of your aircraft. If you have built the tail dragger version you can skip this section of the manual.

Step 1

File a flat on the axle that is the first 1/4-inch (6mm) and a 1/4-inch (6mm) wide area 1-inch (25mm) from the end of the axle.
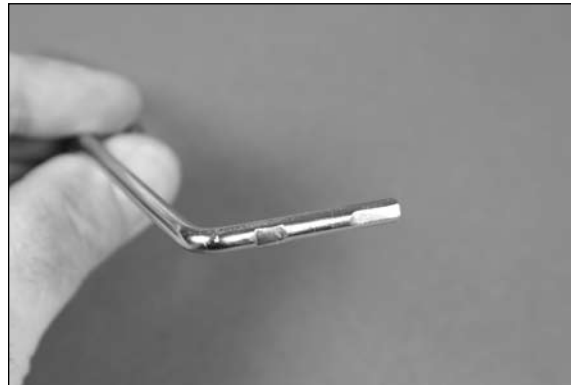
Step 2

Attach the nose wheel to the nose gear using two 4mm wheel collars and setscrews. Make sure to use threadlock on the setscrews so they don't vibrate loose.

Step 3

Connect the bend in the 17$\frac{1}{2}$-inch (445mm) pushrod to the nose gear steering arm. Use side cutters to remove the remaining arm as shown.
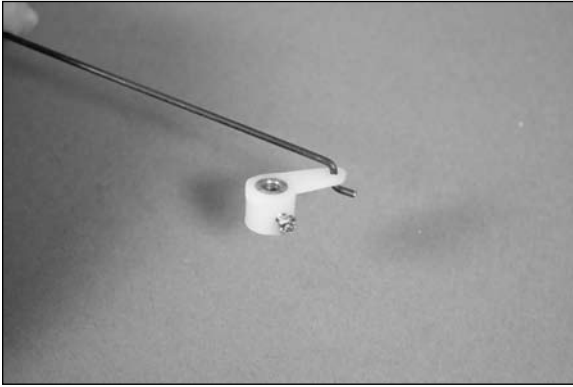
Step 4

Slide the pushrod wire into the tube in the fuselage.
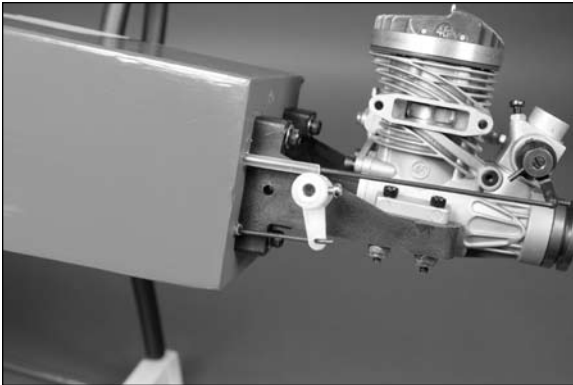
Step 5

Slide the nose gear through the steering arm and into the engine mount. Position the gear so the coils do not touch the bottom of the fuselage. Align the wheel with the fuselage center line. With the arm positioned 5/8-inch (16mm) forward of the firewall, tighten the screw. This will leave a mark so a flat can be filed in the following steps.

5/8-inch (16mm)
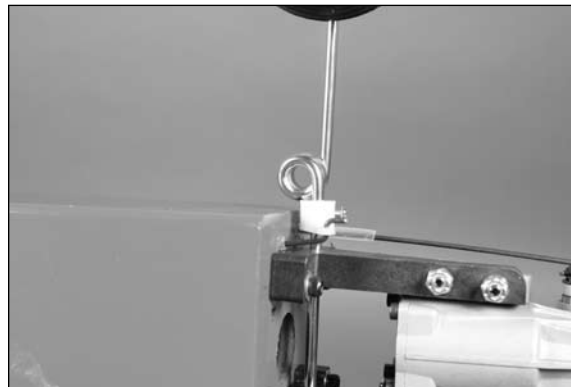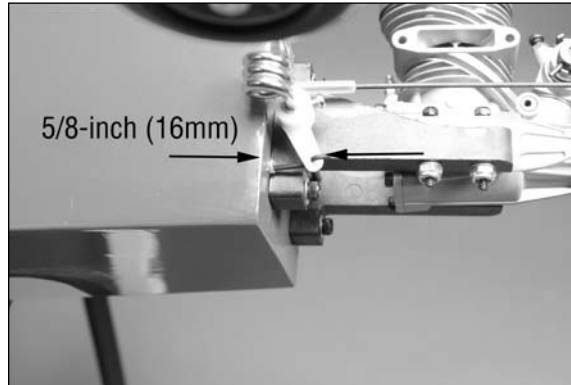
Step 6

Use a felt-tipped pen to mark the nose gear wire against the inside edges of the engine mount rails. Remove the nose gear wire and use a flat file to make flat areas for the wheel collars and steering arm so the gear doesn't twist on the steering arm or dislodge during hard landings.
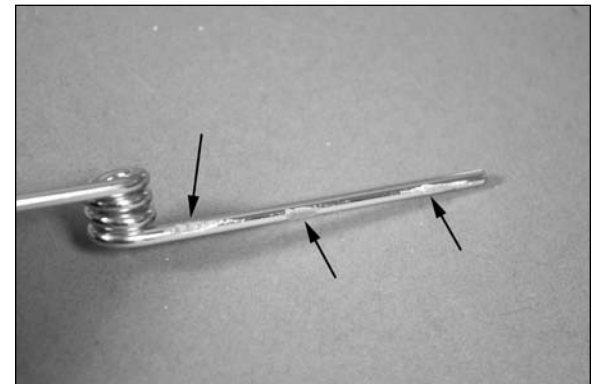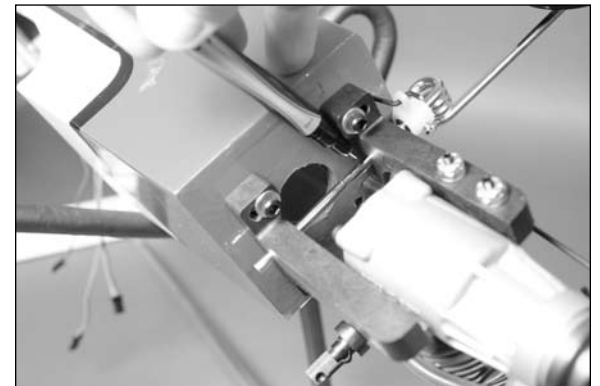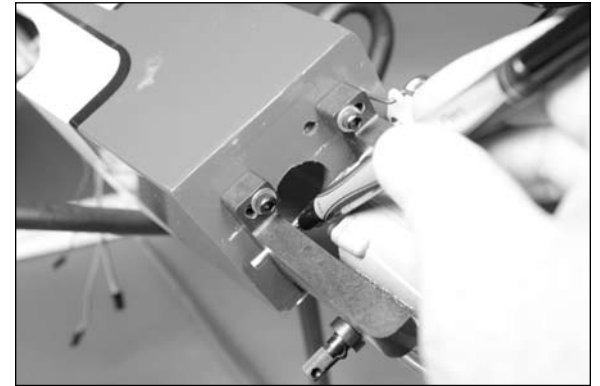
Step 7

Insert the gear and use two 4mm wheel collars and associated setscrews to secure the gear in the engine mount. Tighten the setscrews using a 1.5mm hex wrench. Tighten the screw in the steering at this time as well using a #2 Phillips screwdriver. Make sure to use threadlock on all the hardware so things don't vibrate loose.

Step 8

Complete the nose gear installation by centering the nose gear and rudder servo. Tighten the setscrew in the pushrod connector using a 1.5mm hex wrench. The plywood pushrod standoff will naturally rest on the side of the fuselage at this time. Use medium CA to glue the standoff to the fuselage side.

Fuel Tank Assembly

Required Parts

Fuel tank	Stopper
Aluminum tube (short)	Aluminum tube (long)
Metal disk (small)	Metal disk (large)
Fuel tube, red	Fuel tube, green
Fuel tube, pink	
3mm x 20mm machine screw	

Tools and Adhesives

Phillips screwdriver: #1

Step 1

Locate the items necessary to assemble the fuel tank.
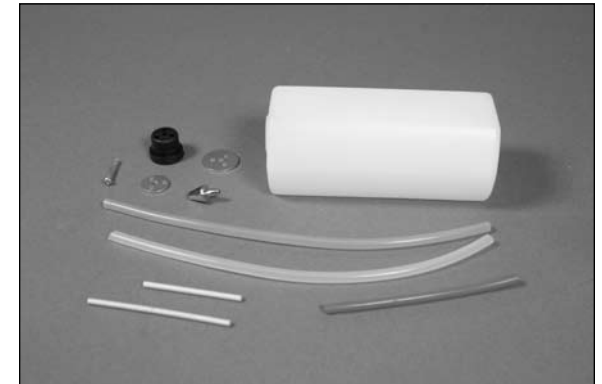
Step 2

Slide the long and short aluminum tubes into the stopper. The holes for these tubes are pre-made in the stopper. Slide the metal disk (small) on the back of the stopper, while the metal disk (large) goes on the front of the stopper.
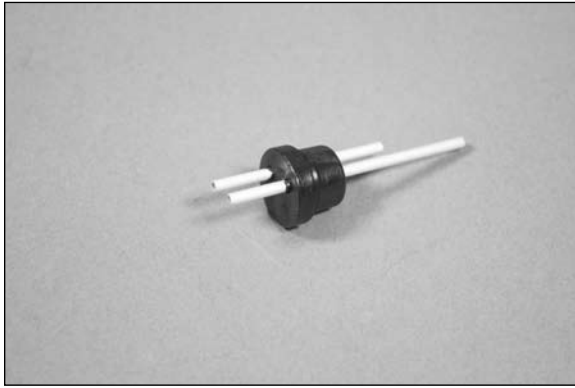
Step 3

Use a #1 Phillips screwdriver to start the 3mm x 20mm machine screw. The screw only needs to be flush with the metal disk (small) at this time. Carefully bend the longer aluminum tube up at a 45-degree angle, being careful not to place a kink in the tube.

Flush
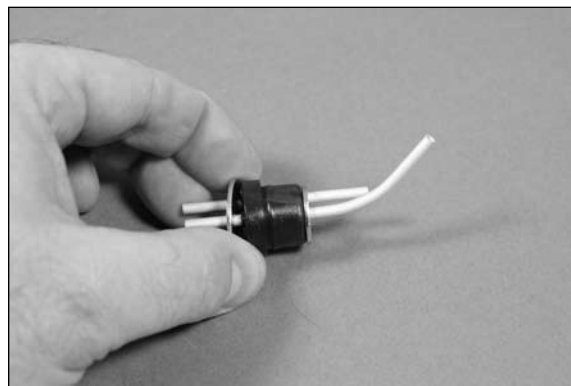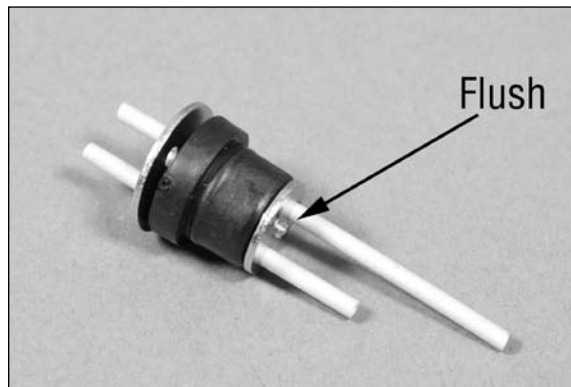
Step 4

Slide the fuel tube (red) on the short aluminum tube. The clunk will fit on the opposite end of the tube. Insert the stopper in the tank and make sure the clunk can move freely inside the tank. If not, shorten the tube slightly so the clunk does not bind inside the tank.

Vent Line

To Muffler   Top View

To Carburetor

Vent Line (faces top of fuselage)   Clunk

Side View
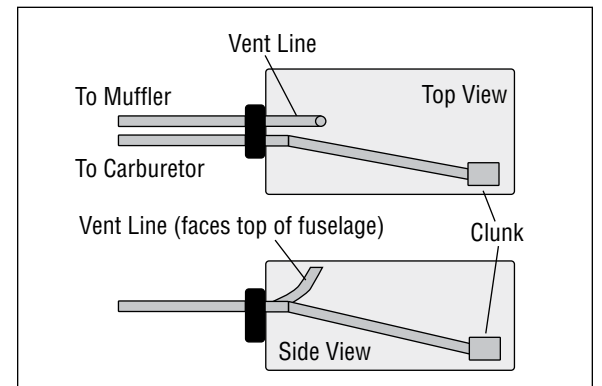
Step 5

Once the clunk line has been adjusted, tighten the 3mm x 20mm machine screw with a #1 Phillips screwdriver to secure the stopper in the tank. Place the pink fuel tube on the vent line, and the green fuel tube on the tube that goes to the clunk.
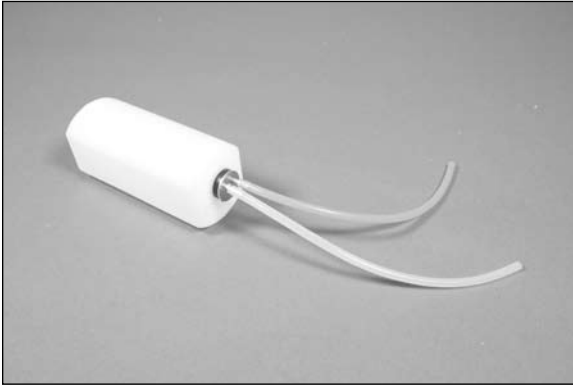
Throttle Pushrod Connection and Fuel Tank Installation

Required Parts

Fuselage assembly	Fuel tank assembly
Muffler	Balsa block
Spinner assembly	Propeller
Servo horn	
Pushrod connector with hardware	
Foam rubber, 1/4-inch (6mm)	

Tools and Adhesives

Drill bit: 5/64-inch (2mm)	Pin vise
Phillips screwdriver, #1	Medium CA
Hex wrench: 1.5mm (included)	
Box wrench (to fit propeller nut)	

Step 1

Use a pin vise and 5/64-inch (2mm) drill bit to enlarge the hole that is 1/2-inch (13mm) from the center of the servo horn.

Step 2

Attach the pushrod connector to the hole in the servo arm as shown. Make sure to use threadlock on the nut so it doesn't vibrate loose.
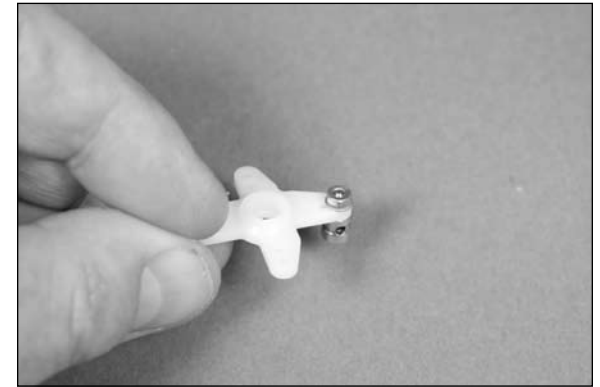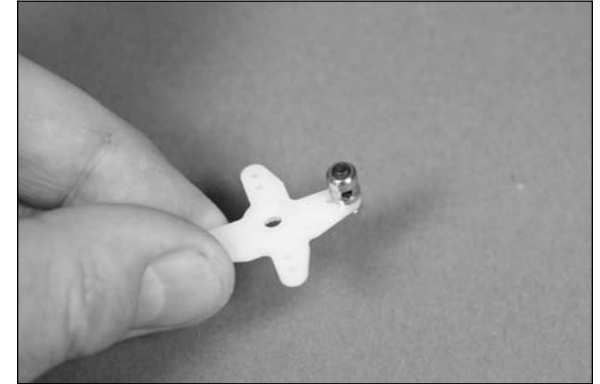
Step 3

With the throttle at the transmitter closed, close the carburetor. Tighten the setscrew in the pushrod connector to secure the throttle pushrod. Check the operation of the throttle using the radio and use the travel at the radio if necessary so the servo does not bind at full throttle. Remove any unused arms from the servo horn using diagonal cutters.
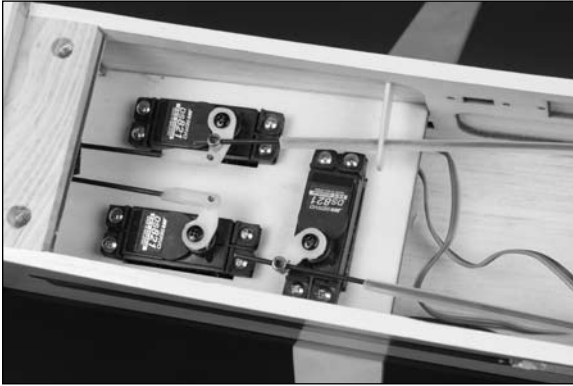
Step 4

Insert the fuel tank in the fuselage. If you have installed the nose gear, make sure the fuel tubes go on either side of the nose gear wire so the tank fits fully into the compartment. Use foam to keep the tank from moving in the fuselage. Glue the balsa block in place using medium CA to secure the tank.

Step 5

Attach the muffler to your engine following the instructions provided with the engine. Connect the green fuel tube to the carburetor and the pink fuel tube to the muffler. Trim the lines if necessary so they don't interfere with the operation of the engine.
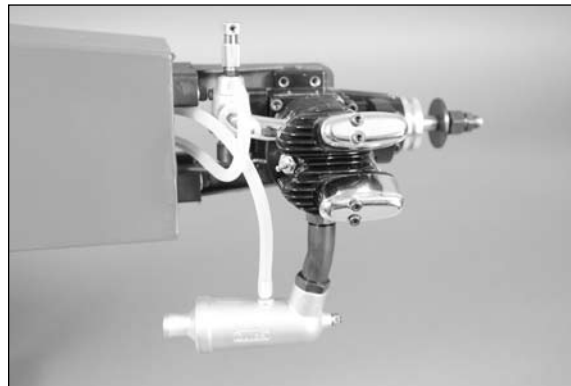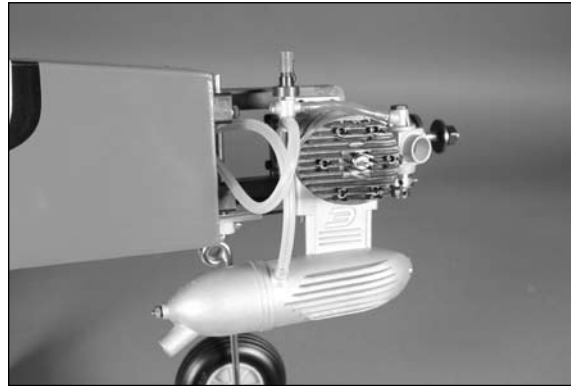
Step 6

Install the propeller and spinner following the instructions provided with the engine. Never use an adjustable wrench to install the propeller nut as it will eventually round the corners of the nut, making it difficult to tighten or loosen in the future.
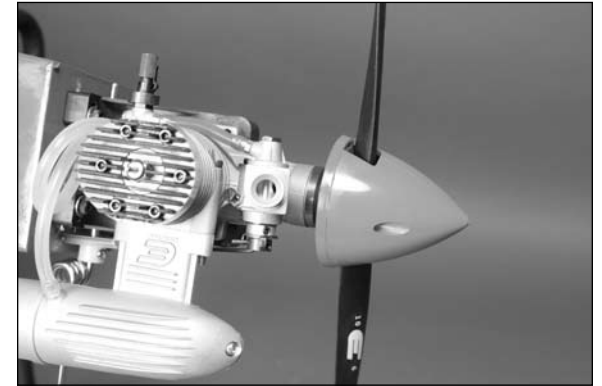
Final Radio Installation

Required Parts

Fuselage assembly	Receiver
Receiver battery	Switch harness
Hook and loop tape (not included)	
Foam rubber: 1/4-inch (6mm) (not included)	

Tools and Adhesives

Hobby knife with #11 blade	Phillips screwdriver: #1

☐ Step 1

Remove the covering from the side of the fuselage using a hobby knife and #11 blade. Insert the wires from the switch into the hole.

☐ Step 2

Cut a piece of foam and place it in the bottom of the fuselage. The receiver and receiver battery will rest on this foam. Plug all the servos and extensions into the receiver. Isolate the battery and receiver using small pieces of foam. Cut a final piece of foam to fit over the receiver and receiver battery.
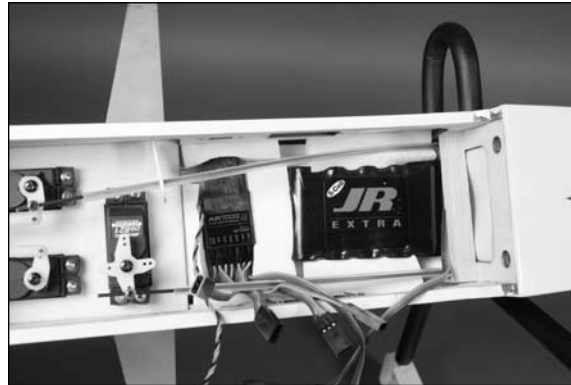
☐ Step 3

Mount the switch in the fuselage using the hardware included with the switch. The remote receiver is then mounted underneath the wing mounting plate using hook and loop tape. Route the wires from the remote receiver so it doesn't interfere with the operation of the servos.
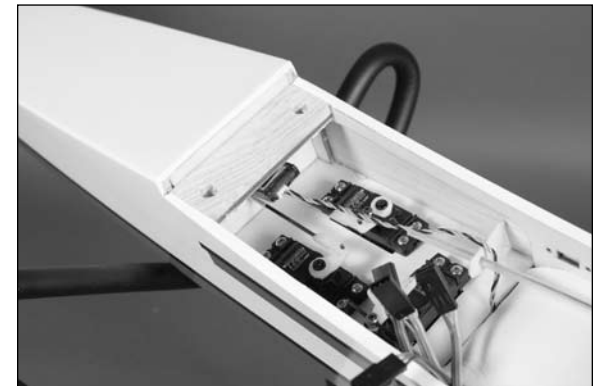
Center of Gravity

An important part of preparing the aircraft for flight is properly balancing the model.

Caution: Do not inadvertently skip this step!

The recommended Center of Gravity (CG) location for the your model is $3^1/_2$- to 4-inches (89mm–101mm) back, or 25% of the chord, from the leading edge of the wing. Mark the location for the Center of Gravity on the bottom of the wing next to the fuselage as shown.

When balancing your model, support the plane upright at the marks made on the top of the wing with your fingers or a commercially available balancing stand. This is the correct balance point for your model. You might find you may be required to add a small amount of weight to either the front or back of the fuselage to achieve the correct balance.
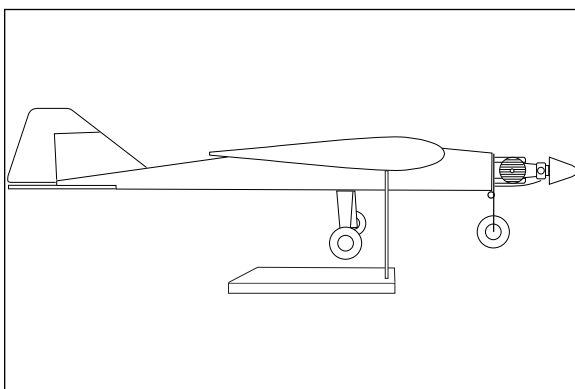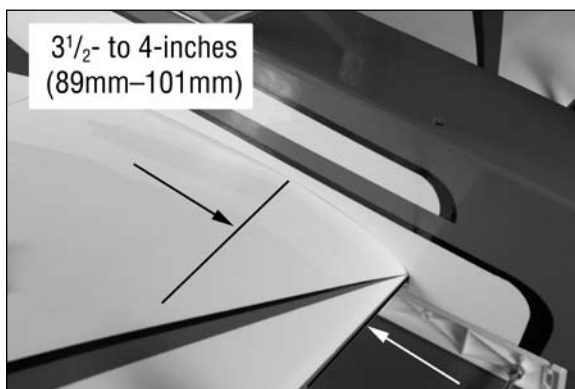
After the first flights, the CG position can be adjusted for your personal preference.

Control Throws

Note: For information regarding the setup of the quad flap option, visit horizonhobby .com for details and programming guidelines.

☐ Step 1

Check the battery voltage on both the transmitter and the receiver battery packs. Do not fly below 4.3V on the transmitter if you are using a Spektrum transmitter that uses 4-cells to power the transmitter. Do not fly below 9.5V on the transmitter if you are using a JR or Spektrum transmitter that uses 8-cells to power the transmitter. Do not fly if the receiver pack is at or below 4.7V. To do so may crash your aircraft.

☐ Step 2

Check the movement of the elevator with the radio system. Moving the elevator stick toward the bottom of the transmitter will make the airplane elevator move up.

☐ Step 3

Check the movement of the ailerons with the radio system. Moving the aileron stick right will make the right aileron move up and the left aileron move down.

☐ Step 4

Use a ruler to adjust the throw of the elevator, ailerons and rudder.

Aileron High Rate

Up	$1^1/_4$-inch	32mm	32 degrees
Down	$1^1/_4$-inch	32mm	32 degrees

Aileron Low Rate

Up	7/8-inch	22mm	17 degrees
Down	7/8-inch	22mm	17 degrees

Elevator High Rate

Up	$1^7/_{16}$-inch	36mm	38 degrees
Down	$1^7/_{16}$-inch	36mm	38 degrees

Elevator Low Rate

Up	7/8-inch	22mm	16 degrees
Down	7/8-inch	22mm	16 degrees

Rudder High Rate

Left	3-inch	76mm	35 degrees
Right	3-inch	76mm	35 degrees

Rudder Low Rate

Left	2-inch	51mm	24 degrees
Right	2-inch	51mm	24 degrees

Flaps

Up	$1^1/_4$-inch	32mm	25 degrees
Down	$1^1/_4$-inch	32mm	25 degrees

Note: Measurements are taken at the inner or widest point on the control surface.

These are general guidelines measured from our own flight tests. You can experiment with higher rates to match your preferred style of flying.

Note: Travel Adjust, Sub-Trim and Dual Rates are not listed and should be adjusted according to each individual model and preference.

Once all control throws are set, shrink the tubing at all the clevises to keep them from opening up during flight. Use caution not to damage the covering around the control horn by applying too much heat.

Quad Flaps

The quad flap option allows your Ultra Stick 40 to perform in ways that are just not possible with the conventional ailerons-only setup. With the quad flaps and a computer radio, different wing configurations can be programmed to extend the flight performance envelope. Plus, it's a great way to learn more about your computer radio. Some of these configurations include:

CROW

Dive Brakes to Landing

Ailerons up

Elevator down slightly
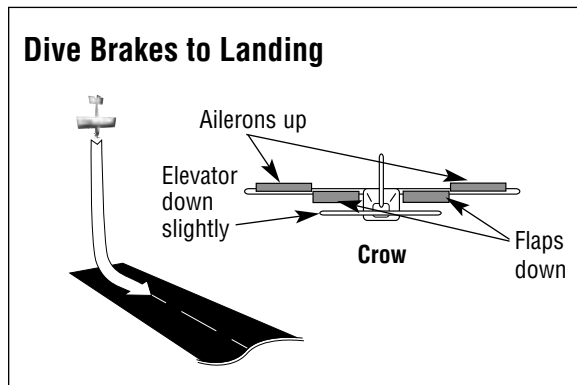
Crow

Flaps down

What is Crow?

Ailerons up, flaps down, elevator down.

What does Crow do?

Crow is a very high drag configuration commonly used as dive brakes to prevent the airplane from building up speed during steep descents/dives. Crow is great for bleeding off excess airspeed and/or altitude, making short landings from high altitudes possible. With a little practice, it's easy to shoot landings in front of yourself from 500 feet or more of altitude and just 100 feet downwind from where you're standing. Just deploy Crow, push the nose straight down, and then pull elevator to level at about 10 feet and land right in front of yourself at a slow walking speed. The drag caused from Crow will prevent the Ultra Stick from gaining speed on the down line and, when the airplane is pulled to level, it will slow to a crawl within a short distance.

Another favorite maneuver that Crow allows is to fly nose high at very slow speeds with a high angle of attack (nearly 45°). Use full up elevator and jockey the throttle position to maintain level flight. This maneuver is sometimes called a Harrier. With crow activated, the Ultra Stick 40 has reduced tendency to tip stall. This is because the up ailerons at the

tips of the wings (washout) help to keep the wing tips from stalling. Use the rudder only to steer the Ultra Stick during this maneuver and be careful if you turn off the Crow at these slow, high angle-of-attack speeds, as there may not be enough airspeed to fly in the conventional mode.

Anytime Crow is activated, the nose pitches up slightly, so it's recommended to mix some down elevator (about 5/8-inch) whenever Crow is used.

First flight profile with Crow

On the first test flights, deploy the Crow at fairly high altitudes at various throttle settings to get a feel for what effects Crow has.

You'll likely notice some reduction in roll control (ailerons) and the extra drag will drastically slow the airplane, no matter what throttle position or maneuver you're doing. Check to see if the nose pitches up or down and adjust the elevator mixing value after landing if necessary. Try some steep descents with Crow and notice that the Ultra Stick 40 builds up very little speed on the way down. Now go ahead and shoot some landings with Crow activated. You'll likely come up way short on your first few full Crow landings, so don't be surprised if you've got to add throttle. With a little practice, you'll confidently be able to do full-up elevator, tail-first landings.

On your first attempts to do the Harrier, start high. Deploy Crow and throttle back to idle; then, start adding up elevator smoothly. As full-up elevator is reached, increase the throttle just enough to maintain altitude. You can fly around in the nose-high attitude using rudder only to steer and, with some practice, you'll be doing Harrier landings with ease.

What to watch out for

In Crow, the wing tips are effectively washed out due to the fact that the up ailerons reduce the tendency to tip stall, making for very stable slow flight when the airplane is upright. When inverted or when doing outside maneuvers, this wash-out effectively becomes wash-in (ailerons are down) and, if you're not careful, a tip stall can occur. Be careful when flying inverted or doing outside maneuvers with Crow deployed as an unexpected tip stall could occur.

Also, when doing high angle-of-attack flight or the Harrier at very slow speeds, it's recommended that you keep the crow turned on. Crow allows the Ultra Stick 40 to actually fly slower and at higher angles of attack than in the conventional configuration.

ELEVATOR-TO-FLAPS

Tight Loops

Flaps down

Elevator up

Couple elevator to flaps
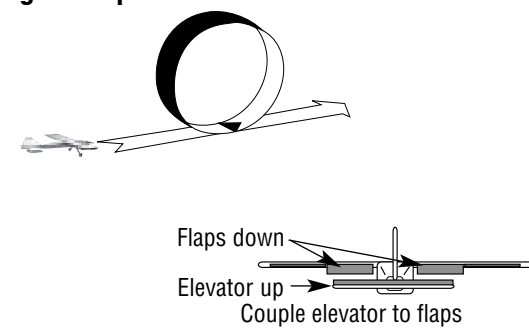
What is elevator-to-flaps?

An up-elevator command causes the flaps to go down, while a down elevator command causes the flaps to go up.

What does elevator-to-flap do?

Elevator-to-flap mixing causes more aggressive pitching when elevator is applied, making for tighter inside and outside loops. Using the recommended throws, the Ultra Stick 40 is capable of very tight 15-foot diameter loops.

First flight profile

It's a good idea to start up high then turn on the elevator-to-flap mixing to get accustomed to the increased pitch (elevator) sensitivity. You may find it necessary to increase the elevator expo to tame the aggressiveness around center. Now try some full up loops first with the mixing on and then off to see just how effective elevator-to-flaps can be. With practice, you can bring these tight loops right down to the deck and even do tight head-high outside loops.

Things to watch out for

The only real place you may run into trouble here is getting used to the increased pitch sensitivity and thus over-control the airplane. Just take it easy, staying high enough that you can handle making at least two mistakes until you're comfortable with the way the Ultra Stick 40 responds. Later you may want to try differing amounts of flap travel with elevator to see the effects.

Rapid Rolls

Flaps follow aileron

Couple ailerons to flaps
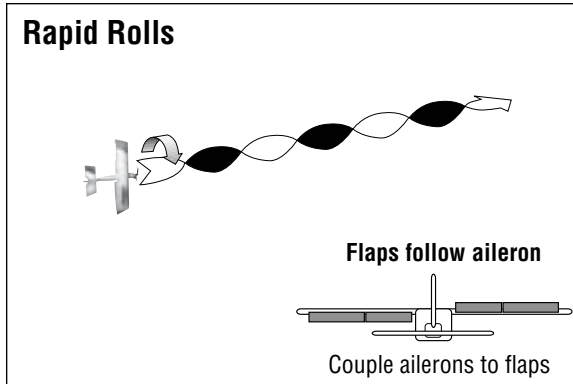
What is aileron-to-flap?

An aileron input causes the flaps to operate in the same direction as ailerons (i.e., a right aileron input causes the right aileron and right flap to go up and the left aileron and left flap to go down).

What does it do?

Aileron-to-flap mixing gives a more aggressive roll rate for doing rapid rolls. This mix also increases the rotation rate of snaps, spins, or any other maneuver that uses ailerons.

First flight profile

Start high and turn on the aileron-to-flap mix. Now do a couple of full-deflection, high-rate rolls and note the difference in roll rate. You should see about a 30% increase in roll speed. Now try a couple of snaps (full up, full right aileron, and full right rudder). You'll find snaps and spins tighter, faster, and more aggressive.

What to watch out for

Be careful not to over-control the ailerons on your first attempts.

Short Takeoff

Flap down

Full flaps
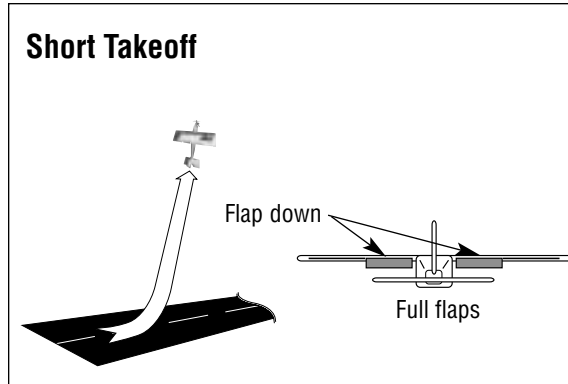
What is short takeoff flaps?

The flaps are set to a down position.

What does it do?

Short takeoff flaps create a high-lift wing that allows the Ultra Stick to do very short takeoffs, in some instances (with a powerful engine and from asphalt) within the length of the fuselage.

First flight profile

After you have become comfortable with the flight characteristics of your Ultra Stick 40, it's time to give the short takeoff flaps a try. On the runway drop the flaps, then when you're ready, punch the throttle and hold some up elevator. Be ready for the Ultra Stick to break ground and head for the skies! It's important to release up elevator when the airplane breaks ground, then turn off the flaps to resume flights. On later flights try holding full up elevator to shorten the roll-out even more.

What to Watch Out For

On your first flap takeoffs, you may be surprised at just how quickly the Ultra Stick 40 pops off the ground, especially with a strong engine. Be ready to release any up elevator quickly. Also, you'll notice that the flap causes the nose to pitch up a bit. We normally don't recommend mixing in elevator compensation (a bit of down elevator), as the intention of short takeoff flaps is to get off the ground in as short a distance as possible. Just turn off the flap shortly after takeoff.

Flight Preparations

Flight preparations must be checked each time you travel to the flying field. Because your model will encounter a variety of situations, it is best to keep an eye on the various components of your model to keep it in the best flying condition.

☐ Checking the Frequency

When using a 2.4GHz radio system, follow the guidelines for use of these radio systems at your particular field.

☐ Checking the Controls

Before starting your engine, check to make sure the controls are operating in the correct directions and the linkages and surfaces are not binding anywhere. Also look at the clevises and clevis retainers to make sure they are secure and will not come loose or fail in flight.

☐ Fueling your Model

Fill the fuel tank with the proper fuel. Fill the tank by connecting the fuel pump to the line going to the needle valve or to the fuel dot on the side of the cowling. Disconnect the fuel line attached to the pressure fitting of the muffler; your tank is full when fuel begins to run out of the pressure line. Reconnect the fuel lines to the needle valve assembly or insert the plug into the fuel dot and connect the line to the muffler.

> **Note**: It is very important to reconnect the lines to the correct place. If they are reconnected incorrectly, the engine will not run properly.

Safety Do's and Don'ts for Pilots

- Ensure that your batteries have been properly charged prior to your initial flight.
- Keep track of the time the system is turned on so you will know how long you can safely operate your system.
- Perform a ground range check prior to the initial flight of the day. See the "Daily Flight Checks Section" for information.
- Check all control surfaces prior to each takeoff.
- Do not fly your model near spectators, parking areas or any other area that could result in injury to people or damage of property.
- Do not fly during adverse weather conditions. Poor visibility can cause disorientation and loss of control of your aircraft. Strong winds can cause similar problems.
- Do not point the transmitter antenna directly toward the model. The radiation pattern from the tip of the antenna is inherently low.
- Do not take chances. If at any time during flight you observe any erratic or abnormal operation, land immediately and do not resume flight until the cause of the problem has been ascertained and corrected. Safety can never be taken lightly.

Dual Rate Recommendations

- We recommend that the rudder dual rate be set to Low for takeoff to help minimize overcorrection during the takeoff roll.
- We recommend the rudder dual rate be set to High for landing to help maintain heading as the model transitions from flying speed to taxi speeds.
- Elevator and Aileron dual rates should be adjusted for personal feel and also if there is any unusual wind conditions.

Daily Flight Checks

☐ Step 1

Check the battery voltage on both the transmitter and the receiver battery packs. Do not fly below 4.3V on the transmitter if you are using a Spektrum transmitter that uses 4-cells to power the transmitter. Do not fly below 9.5V on the transmitter if you are using a JR or Spektrum transmitter that uses 8-cells to power the transmitter. Do not fly if the receiver pack is at or below 4.7V. To do so may crash your aircraft.

Note: When you check these batteries, ensure that you have the polarities correct on your expanded scale voltmeter.

☐ Step 2

Check all hardware (linkages, screws, nuts, and bolts) prior to each day's flight. Be sure that binding does not occur and that all parts are properly secured.

☐ Step 3

Ensure that all surfaces are moving in the proper manner.

☐ Step 4

Perform a ground range check before each day's flying session.

☐ Step 5

Prior to starting your aircraft, turn off your transmitter, then turn it back on. Do this each time you start your aircraft. If any critical switches are on without your knowledge, the transmitter alarm will warn you at this time.

☐ Step 6

Check that all trim levers are in the proper location.

☐ Step 7

All servo pigtails and switch harness plugs should be secured in the receiver. Make sure that the switch harness moves freely in both directions.

Safety, Precautions and Warnings

As the user of this product, you are solely responsible for operating it in a manner that does not endanger yourself and others or result in damage to the product or the property of others.

Carefully follow the directions and warnings for this and any optional support equipment (chargers, rechargeable battery packs, etc.) that you use.

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

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

Warranty Information

WARRANTY PERIOD

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

LIMITED WARRANTY

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

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

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

DAMAGE LIMITS

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

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

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

SAFETY PRECAUTIONS

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

QUESTIONS, ASSISTANCE, AND REPAIRS

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

INSPECTION OR REPAIRS

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

WARRANTY INSPECTION AND REPAIRS

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

NON-WARRANTY REPAIRS

Should your repair not be covered by warranty the repair will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of 1/2 hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. Please note: non-warranty repair is only available on electronics and model engines.

United States:

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

Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822
USA

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

Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822
USA

Please call 877-504-0233 or e-mail us at productsupport@ horizonhobby.com with any questions or concerns regarding this product or warranty.

United Kingdom:

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

Horizon Hobby UK
Units 1-4 Ployters Rd
Staple Tye
Harlow, Essex
CM18 7NS
United Kingdom

Please call +44 (0) 1279 641 097 or e-mail us at sales@ horizonhobby.co.uk with any questions or concerns regarding this product or warranty.

Germany:

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

Horizon Technischer Service
Hamburger Strasse 10
25335 Elmshorn
Germany

Please call +49 4121 46199 66 or e-mail us at service@ horizonhobby.de with any questions or concerns regarding this product or warranty.

Instructions for Disposal of WEEE by Users in the European Union

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.
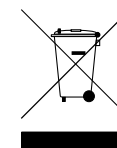
2009 Official Academy of Model Aeronautics Safety Code

GENERAL

1. A model aircraft shall be defined as a non-human-carrying device capable of sustained flight in the atmosphere. It shall not exceed limitations established in this code and is intended to be used exclusively for recreational or competition activity.

2. The maximum takeoff weight of a model aircraft, including fuel, is 55 pounds, except for those flown under the AMA Experimental Aircraft Rules.

3. I will abide by this Safety Code and all rules established for the flying site I use. I will not willfully fly my model aircraft in a reckless and/or dangerous manner.

4. I will not fly my model aircraft in sanctioned events, air shows, or model demonstrations until it has been proven airworthy.

5. I will not fly my model aircraft higher than approximately 400 feet above ground level, when within three (3) miles of an airport without notifying the airport operator. I will yield the right-of-way and avoid flying in the proximity of full-scale aircraft, utilizing a spotter when appropriate.

6. I will not fly my model aircraft unless it is identified with my name and address, or AMA number, inside or affixed to the outside of the model aircraft. This does not apply to model aircraft flown indoors.

7. I will not operate model aircraft with metal-blade propellers or with gaseous boosts (other than air), nor will I operate model aircraft with fuels containing tetranitromethane or hydrazine.

8. I will not operate model aircraft carrying pyrotechnic devices which explode burn, or propel a projectile of any kind. Exceptions include Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight. Rocket motors up to a G-series size may be used, provided they remain firmly attached to the model aircraft during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code; however, they may not be launched from model aircraft. Officially designated AMAAir Show Teams (AST) are authorized to use devices and practices as defined within the Air Show Advisory Committee Document.

9. I will not operate my model aircraft while under the influence of alcohol or within eight (8) hours of having consumed alcohol.

10. I will not operate my model aircraft while using any drug which could adversely affect my ability to safely control my model aircraft.

11. Children under six (6) years old are only allowed on a flightline or in a flight area as a pilot or while under flight instruction.

12. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

RADIO CONTROL

1. All model flying shall be conducted in a manner to avoid over flight of unprotected people.

2. I will have completed a successful radio equipment ground-range check before the first flight of a new or repaired model aircraft.

3. I will not fly my model aircraft in the presence of spectators until I become a proficient flier, unless I am assisted by an experienced pilot.

4. At all flying sites a line must be established, in front of which all flying takes place. Only personnel associated with flying the model aircraft are allowed at or in front of the line. In the case of airshows demonstrations straight line must be established. An area away from the line must be maintained for spectators. Intentional flying behind the line is prohibited.

5. I will operate my model aircraft using only radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.

6. I will not knowingly operate my model aircraft within three (3) miles of any preexisting flying site without a frequency-management agreement. A frequencymanagement agreement may be an allocation of frequencies for each site, a day-use agreement between sites, or testing which determines that no interference exists. A frequency-management agreement may exist between two or more AMA chartered clubs, AMA clubs and individual AMA members, or individual AMA members. Frequency-management agreements, including an interference test report if the agreement indicates no interference exists, will be signed by all parties and copies provided to AMA Headquarters.

7. With the exception of events flown under official AMA rules, no powered model may be flown outdoors closer Building and Flying Notes:than 25 feet to any individual, except for the pilot and located at the flightline.

8. Under no circumstances may a pilot or other person touch a model aircraft in flight while it is still under power, except to divert it from striking an individual.

9. Radio-controlled night flying is limited to low-performance model aircraft (less than 100 mph). The model aircraft must be equipped with a lighting system which clearly defines the aircraft's attitude and direction at all times.

10. The operator of a radio-controlled model aircraft shall control it during the entire flight, maintaining visual contact without enhancement other than by corrective lenses that are prescribed for the pilot. No model aircraft shall be equipped with devices which allow it to be flown to a selected location which is beyond the visual range of the pilot.

HANGAR 9 ®

Fly First Class ™

HORIZON
H   O   B   B   Y